FAO Fisheries Report No. 735, Supplement **FIPL/R735, Suppl. (En)**

ISSN 0429-9337

ADVISORY COMMITTEE ON FISHERIES RESEARCH

Papers presented at the

SECOND SESSION OF THE WORKING PARTY ON SMALL-SCALE FISHERIES

Bangkok, Thailand, 18–21 November 2003

Copies of FAO publications can be requested from:
Sales and Marketing Group
Information Division
FAO
Viale delle Terme di Caracalla
00100 Rome, Italy
E-mail: publications-sales@fao.org
Fax: (+39) 06 57053360

Papers presented at the

SECOND SESSION OF THE WORKING PARTY ON SMALL-SCALE FISHERIES

Bangkok, Thailand, 18–21 November 2003

Edited by

Benedict P. Satia
Chief, International Institutions and Liaison Service
FAO Fisheries Department
and
Derek Staples
Senior Regional Fishery Officer
FAO Regional Office for Asia and the Pacific

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 2004

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

ISBN 92-5-105256-5

All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed to the Chief, Publishing Management Service, Information Division, FAO, Viale delle Terme di Caracalla, 00100 Rome, Italy or by e-mail to copyright@fao.org

© FAO 2004

Copyrighted material

PREPARATION OF THIS DOCUMENT

This document contains the papers submitted by the FAO Secretariat and delegates to the second session of the Working Party on Small-scale Fisheries of the Advisory Committee on Fisheries Research (ACFR), held in Bangkok, Thailand, from 18 to 21 November 2003. The meeting was jointly organized by the International Institutions and Liaison Service (FIPL) of the Fisheries Department in FAO headquarters and by the Regional Office for Asia and the Pacific (RAP) in Bangkok. The views expressed in these papers are those of the author(s) and should not be attributed to their organizations.

The Report of the Working Party on Small-scale Fisheries of the Advisory Committee on Fisheries Research (ACFR) has been published as FAO Fisheries Report No. 735. The report is also available on the FAO Website.

Satia, B.P.; Staples, D. (eds.)
Advisory Committee on Fisheries Research. Papers presented at the second session of the Working Party on Small-scale Fisheries. Bangkok, Thailand, 18–21 November 2003.
FAO Fisheries Report. No. 735, Suppl. Rome, FAO. 2004. 198p.

ABSTRACT

At the fourth session of the FAO Advisory Committee on Fisheries Research (ACFR), in December 2002, the Committee highlighted that small-scale fisheries had not received the research attention that they deserved considering the important contribution that they make to nutrition, food security, sustainable livelihoods and poverty alleviation, especially in developing countries. The Committee pointed out that although many of the issues such as user-rights, excess capacity, illegal, unreported and unregulated fishing, trade and incentives, governance, etc. are common across all fisheries, they need explicit attention in the small-scale fisheries (SSF) context. The Committee recommended that a working party be convened to elaborate a draft research agenda and undertake an evaluation of the role and importance of small-scale (marine) fisheries and outline ways in which the transition to responsible fisheries could be facilitated, bearing in mind the developing paradigm of Ecosystem Approach to Fisheries (EAF). The scope was later extended within the FAO Fisheries Department to also include estuarine and inland water capture fisheries.

The Working Party held its meeting in Bangkok, Thailand, from 18 to 21 November 2003. This document contains the eight papers submitted to the Working Party. The papers highlight main research themes that should be considered in formulating a draft research agenda for small-scale fisheries. These themes include policy legislation governance and institutional arrangements; contribution, relevance and importance of small-scale fisheries to national economies and livelihood; management approaches to small-scale fisheries; post-harvest issues and trade; information systems for small-scale fisheries, and also emphasize strategies and mechanisms to bridge the gap between research and action. Drawing on the output of the Working Party and the papers in this document, two separate documents, a draft research agenda for small-scale fisheries and contribution, role and importance of small-scale fisheries are in preparation.

Distribution:

Participants
ACFR Members
FAO Fisheries Officers, Regional and Subregional Offices

CONTENTS

Page

Contributors vii

List of acronyms and abbreviations ix

1. CONCEPT PAPER FOR THE ADVISORY COMMITTEE ON FISHERIES RESEARCH (ACFR) WORKING PARTY ON SMALL-SCALE FISHERIES 1

2. CONTRIBUTION OF SMALL-SCALE FISHERIES TO RURAL LIVELIHOODS IN A WATER MULTI-USE CONTEXT (WITH A PARTICULAR EMPHASIS ON THE ROLE OF FISHING AS "LAST RESORT ACTIVITY" FOR THE POOR) 20

3. SMALL-SCALE FISHERIES: PAST EXPERIENCE AND FUTURE SOLUTIONS 50

4. POLICY OBJECTIVES, LEGAL FRAMEWORKS, INSTITUTIONS AND GOVERNANCE IN SMALL-SCALE FISHERIES 71

5. PROMOTING THE ECOSYSTEM APPROACH TO FISHERIES IN THE CONTEXT OF SMALL-SCALE FISHERIES 99

6. IMPROVING THE COLLECTION, ANALYSIS AND DISSEMINATION OF INFORMATION IN SMALL-SCALE FISHERIES 118

7. THE CONTRIBUTION OF RESEARCH TO THE SUSTAINABLE LIVELIHOODS OF ARTISANAL FISHING COMMUNITIES 142

8. BRIDGING THE GAP BETWEEN FISHERIES RESEARCH AND ACTION 194

CONTRIBUTORS

Christophe BÉNÉ Research Scientist WorldFish Center Africa and West Asia Office Cairo, Egypt Mobile: 201 10 125 0185 Tel.: 202 736 4114 (Ext. 109) Fax: 202 736 4112 E-mail: c.bene@cgiar.com	Christopher NINNES Regional Fisheries Information Systems Project Southern African Development Community (SADC) Secretariat Gaborone, Botswana
Robin MAHON Senior Lecturer Centre for Resource Management and Enviromental Studies (CERMES) University of the West Indies Cave Hill, Barbados Tel.: +246 417 457 Fax: +246 424 4204 E-mail: rmahon@caribsurf.com	Benedict Satia Chief, International Institutions and Liaison Service, FIPL Secretary of ACFR FAO Fisheries Department Viale delle Terme di Caracalla 00100 Rome, Italy Tel.: +39 06 570 52847 Fax: +39 06 570 56500 E-mail: benedict.satia@fao.org
Graeme MACFADYEN Director Poseidon 8 Place Aux Bois 74000 Annecy France Tel./Fax: +33 (0) 450 33 05 02 E-mail: graeme@consult-poseidon.com	Derek STAPLES Senior Fishery Officer FAO Regional Office for Asia and the Pacific 39 Phra Athit Road Bangkok 10200, Thailand Tel.: +662 697 4119 Fax: +662 697 4445 E-mail: derek.staples@fao.org
Karim HUSSEIN Research fellow Overseas Development Institute London, United Kingdom	Jean ZOUNDI Head of the Department of Liaison Research Development Institut de l'environnement et de la recherche agricole (INERA), Ouagadougou, Burkina Faso

LIST OF ACRONYMS AND ABBREVIATIONS

ACFR	Advisory Committee on Fisheries Research
ACP	African, Caribbean and Pacific Group of States
ADAMAM	Association pour le développement des activités de mareyage de Mboa-Manga (Cameroun)
ADF	African Development Foundation
ADS	Agence pour le développement social
AFCOD	West/North-West Artisanal Fisheries and Community Development Project
AMED	Approche pour des moyens d'existence durables
APCAM	Assemblée permanente des chambres d'agriculture du Mali
APPM	Association des pêcheurs et pisciculteurs du Mali
APRAM	Association des pêcheurs résidents au Mali
BAD	Banque africaine de développement
BADEA	Banque arabe pour le développement économique en Afrique
BARNUFO	Barbados national Union of Fisherfolk Organizations
BM	Banque mondiale
BVI	British Virgin Islands
CARICOM	Caribbean Community Secretariat
CBA	Cost Benefit Analysis
CBEM	Community-Based Ecotourism Management
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCPR	Code de conduite pour une pêche responsable
CCRF	Code of Conduct for Responsible Fisheries
CDPM	Caisse de développement des pêches maritimes
CDTs	Community Development Teams
CDUs	Community Development Units
CEMAC	Central African Economic and Monetary Community
CEMARE	Centre for the Economics and Management of Aquatic Resources
CENACOP	Central Artisanal Fishing Cooperative
CERESCOR	Centre de recherche scientifique de Conakry – Rogbanè (Guinée)
CFAF	CFA franc
CFP	Coastal Fisheries Programme (Pacific Islands)
CGIAR	Consultative Group on International Agricultural Research
CMS	Crédit mutuel du Sénégal
CNCPM	Conseil national consultatif des pêches maritimes
CNCR	Conseil national de concertation des ruraux (Sénégal)
CNPS	Conseil national des pêcheurs artisans du Sénégal
CNRA	Comité national de la recherche agricole (Mali)
CNROP	Centre national de recherches océanographiques et des pêches (Mauritanie)
CNSHB	Centre national des sciences halieutiques de Boussoura (Guinée)
COFFUB	Co-operative of Female Fish Smokers of Bonfi
COFI	Committee on Fisheries
CONAPEG	Confédération nationale des professionnels de la pêche en Guinée
CRAT	Centre régional africain de technologie
CRDI	Centre de recherches pour le développement international
CREDETIP	Centre de recherche pour le développement de technologies intermédiaires de pêche (Sénégal)
CRFM	Caribbean Regional Fisheries Mechanism
CRM	Coastal Resource Management
CRODT	Centre de recherches océanographiques Dakar-Thiaroye (Sénégal)
CRU	Commissions régionales des utilisateurs (Mali)
CSLP	Cadre stratégique de lutte contre la pauvreté

This One
L6LE-SNA-D1R6

DANIDA	Danish International Development Agency
DFID	Department for International Development (Coopération du Gouvernement Britannique)
DFMR	Department of Fisheries and Marine Research
DFO	Department of Fisheries and Oceans (Canada)
DOF	Department on Fisheries
DRSP	Document de stratégie de réduction de la pauvreté
DWFN	Distant Water Fishing Nations
EAF	Ecosystem Approach to Fisheries
EC	European Commission
EcIA	Economic Impact Analysis
EDM	Energie du Mali
EEA	Economic Efficiency Analysis
EEZs	Exclusive Economic Zones
ENDA/TM	Environmental Development Action in the Third World Environnement et développement du tiers monde
EPA	Etablissement public à caractère administratif
EPST	Etablissement public à caractère scientifique et technique
EU	European Union
FAC	Fisheries Advisory Committee
FACs	Fisheries Advisory Committees
FAH	Fonds d'aménagement halieutique
FAO	Food and Agriculture Organization of the United Nations
FARMC	Fisheries and Aquatic Resources Management Council (Philippines)
FCFA	Franc CFA
FENAGIE-P	Fédération nationale des groupements d'intérêt économique de pêche (Sénégal)
FENAMS	Fédération nationale des mareyeurs du Sénégal
FEP	Fisheries Enhancement Programmes
FFDF	Federation of Fouta Djallon Farmers
FIDA	Fonds international de développement agricole
FIS	Fisheries Information System
FISON	Fisheries Society of Nigeria
FM	Fisheries Management
FMCA	Fishery Conservation and Management Act
FMO	Fisheries Management Organization
FMP	Fisheries Management Plan
FNP	Fédération nationale de pêche (Mauritanie)
FNPCG	Fédération nationale des planteurs de café de Guinée
FNRAA	Fonds national pour la recherche agricole et agro-alimentaire (Sénégal)
FPFD	Fédération des paysans du Fouta Djallon (Guinée)
FRAC	Fish Resource Advisory Council
GDP	Gross Domestic Product
GIE	Groupement d'intérêt économique
GRT	Gross Registered Tonnage
GTZ	German Agency for Technical Cooperation
HACCP	Hazard Analysis Critical Control Point
HIPC	Heavily Indebted Poor Countries
HM	Highly Migratory
ICAM	Integrated Coastal Area Management
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICLARM	International Centre for Living Aquatic Resources Management
IDAF	Integrated Development of Artisanal Fisheries
IDDRA	Institut pour le développement durable des ressources aquatiques
IDR	Institute for Development Research

IEC	Information, Education and Communication
IER	Institute of Rural Economy (Mali)
IEZ	Inshore Exclusion Zone
IFAD	International Fund for Agricultural Development
IFT	Institute for Food Technology
IIED	International Institute for Environment and Development
IIFET	International Institute for Fisheries Economics and Trade
IMBO	Institute of Marine Biology and Oceanography (Sierra Leone)
IMF	International Monetary Fund
IMROP	Institut mauritanien de recherches océanographiques et des pêches
INERA	Institut de l'environnement et de recherches agricoles du Burkina Faso
IOCARIBE	Sub-Commission for the Caribbean and Adjacent Regions
IRAD	Institute for the Agricultural Research (Cameroon)
IRAG	Institut de recherche agronomique de Guinée
ISAR RFE	Initiative for Social Action and Renewal in Eurasia
ISRA	Institut sénégalais de recherches agricoles
ITA	Institut de technologie alimentaire (Sénégal)
ITQ	Individual Transferable Quota
IUCN	International Union for Conservation of Nature and Natural Resources
IUU	Illegal, Unreported and Unregulated (fishing)
LA	Livelihoods Analysis
LDC	Least Developed Countries
LME	Large Marine Ecosystem
MANOBI	Société spécialisée en exploitation des technologies internet et téléphone mobile (Sénégal)
MCS	Monitoring Control and Surveillance
ME	Moyens d'existence
MEAs	Multilateral Environment Agreements
MED	Moyens d'existence durables
MIDECAM	Mission de développement de la pêche maritime
MIDEPECAM	Mission de développement de la pêche artisanale maritime
MPA	Marine Protected Area
MPEM	Ministère des pêches et de l'économie maritime (Mauritanie)
MRAG	Marine Resources Assessment Group
NACCIMA	Nigerian Chamber of Commerce, Industry, Manufacturing and Agriculture
NAFFA	National Association of Fish-farmers (Nigeria)
NAIRA	Nigerian currency
NAMMCO	North Atlantic Marine Mammal Commission
NCA	National Council on Agriculture (Nigeria)
NCU	National Coordinating Unit
NEAFC	Northeast Atlantic Fisheries Commission
NFA	National Fisheries Board
NFAAR	National Fund for Agricultural and Agro-allied Research
NFCPC	National Federation of Coffee Planters of Guinea
NFP	National Fisheries Policy
NGO	Non-governmental organization
NIFFR	Nigerian Institute for Freshwater Fisheries Research
NIOMR	Nigerian Institute for Oceanography and Marine Research
NMFS	National Marine Fisheries Service
NORAD	Norwegian Agency for International Development
NPRS	National Poverty Reduction Strategies
NR	Natural Resources
NRMCs	Natural Resource Management Committee
NUFAS	National Union of Fishermen and Seafood Dealers

NUFSD	Nigerian Union of Fisherman and Sea Food Dealers
OCEANIUM	Association sénégalaise travaillant sur la protection et conservation des ressources naturelles
ODI	Overseas Development Institute
ODRS	Office for Rural Development of Sélingué (Mali)
OECS	Organization of Eastern Caribbean States
OEPS	Economic Observatory of the Fishing Sector
OFP	Oceanic Fisheries Programme (Pacific Islands)
OLDEPESCA	Latin American Organization for Fishery Development
ONG	Organisation non-gouvernementale
OPM	Opération pêche Mopti (Mali)
PA	Pêche artisanale
PAE	Public Administrative Establishment
PCMR	Parliamentary Committee on Marine Resources (Sierra Leone)
PI	Pêche industrielle
PIB	Produit intérieur brut
PIP	Policy, Institutions and Processes Politiques, institutions et processus
PIPC	Programme intérimaire post-conflit
PIPs	Policies, Institutions and Processes
PNBA	Banc d'Arguin National Park (Mauritania)
PNG	Papua New Guinea
PNVRA	Programme national de vulgarisation et de recherche agricole (Cameroun)
PO	Professional Organization
POSEIDON	Aquatic Resources Management Ltd.
PRA	Participatory Rural Appraisal
PRSPs	Poverty Reduction Strategy Papers
PSC	Pacific Salmon Commission
PSTE	Public Scientifc and Technical Establishment
RFO	Regional Fishery Organization
RSU	Regional Support Unit
SADC	Southern African Development Community
SADP	Stratégie d'aménagement du secteur des pêches et de l'économie maritime
SAILD	Service d'appui aux initiatives locales de développement
SAM	Special Area Management
SAPA	Subregional Office for the Pacific Islands
SDPA	Strategic Document on Poverty Alleviation
SEMRY	Rice Culture Expansion and Modernization Authority
SFA	Sustainable Fishery Advocates
SFLP	Sustainable Fisheries Livelihoods Programme
SIDs	Small Island Developing States
SL	Sustainable Livelihoods
SLA	Sustainable Livelihoods Approach
SNV	Swedish Environmental Protection Agency
SOWEDA	South West Development Authority (Cameroon)
SPC	Secretariat of the Pacific Community
SSF	Southern Shark Fishery
SSI	Semi-structured Interviews
STC	Scientific and Technical Committee
TA	Traditional Authority
TAC	Total Allowable Catch
TCP (FAO)	Technical Cooperation Programme (FAO)
TEV	Total Economic Value
TM	Tiers monde
TMAF	Traditional Management of Artisanal Fisheries

TOR	Terms of Reference
UCAD	Université Cheikh Anta Diop
UCN	Unité de coordination nationale (PMEDP)
UICN	International Union for Conservation of Nature
UM	Ouguiya (Currency in Mauritania)
UN/SOCA	Sub-Committee on Oceans and Coastal Areas
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNPAG	National Union of artisanal fishermen of Guinea
USAID	United States Agency for International Development
VAT	Value Added Tax
VMC	Village Management Committees
VPA	Virtual Population Analysis
WB	World Bank
WECAFC	Western Central Atlantic Fisheries Commission
WECAFC	Western Central Atlantic Fisheries Commission
WNW-AFCOD	West/North-West Artisanal Fisheries and Community Development Programme
WTO	World Trade Organization
WWF	World Wildlife Fund

1. CONCEPT PAPER FOR THE ADVISORY COMMITTEE ON FISHERIES RESEARCH (ACFR) WORKING PARTY ON SMALL-SCALE FISHERIES

Derek Staples

SUMMARY

The purpose of this paper is to provide a framework to aid discussion for FAO's Advisory Committee on Fisheries Research (ACFR) Working Party on Small-Scale Fisheries. In particular, following the ACFR recommendations the paper addresses:

1. elaborating a draft research agenda;
2. undertaking an evaluation of the role and importance of small-scale marine fisheries, and
3. outlining ways in which the transition to responsible fisheries can be facilitated, bearing in mind the developing paradigm of the Ecosystem Approach to Fisheries (EAF).

The framework for elaborating a draft research agenda is based on identifying a number of issues pertinent to small-scale fisheries, and then providing a lead to possible research activities. The list is not exhaustive, but hopefully, sufficient to initiate and structure discussion.

After presenting a conceptual framework for small-scale fisheries that stresses the importance of considering factors both within the subsector, and external to the subsector, the following issues were identified:

- effectiveness of development policy to small-scale fisheries;
- measurement and understanding causes of poverty;
- competing policy goals;
- profile of small-scale fisheries in national policies and international development initiatives;
- tailoring fisheries management to small-scale fisheries;
- impacts of globalization and increased fish trade, and
- technological advances.

In reference to the second task presented above, the paper highlights the serious lack of reliable information on small-scale fisheries and suggests some approaches that could be used to overcome this deficiency. Lastly the paper describes ways that the transition to responsible fisheries can be facilitated, highlighting the importance of communicating research results, and also in adopting a more participatory fisheries management approach that considers fishing in the context of a larger system (ecosystem), and recognizing the need to satisfy the goals and aspirations of a wide range of uses and users (ecosystem approach to fisheries).

I. BACKGROUND

At the fourth session of the FAO Advisory Committee on Fisheries Research (ACFR) held in Rome in December 2002, the committee highlighted that small-scale fisheries had not received the research attention that it deserves when one considers the important contribution that this subsector makes to nutrition, food security, sustainable livelihoods and poverty alleviation, especially in developing countries. Although many of the issues such as user rights, excess capacity, illegal, unreported and unregulated (IUU) fishing, trade and incentives, governance etc, are common across all fisheries, these issues need explicit attention in a small-scale fisheries context. The committee emphasized the need for research to enhance our understanding of the dynamics of the subsector and recommended the establishment of an ACFR Working Party on Small-scale Fisheries[1] to:

---

[1] Note: the focus was originally on marine capture fisheries but was later extended to freshwater and estuarine systems.

1. elaborate a draft research agenda;
2. undertake an evaluation of the role and importance of small-scale marine fisheries; and
3. outline ways in which the transition to responsible fisheries can be facilitated, bearing in mind the developing paradigm of the ecosystem approach to fisheries (EAF).

Nature and characteristics of small-scale fisheries

Small-scale fisheries occur world-wide in both developed and developing countries, but it is in developing countries that they play a vital role in the nutrition, food security and poverty alleviation of a large number of the world's inhabitants. Although some may be relatively well off, the majority of people undertaking small-scale fisheries in developing countries are relatively poor and vulnerable and it is this group that is the focus of the ACFR.

Small-scale fisheries can be broadly characterized as employing labour-intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources[ref 1]. The activities of the subsector provides a source of food and livelihood for many of the world's poor and mainly supply fish and fishery products to local and domestic markets. They are harvested by both part-time (often seasonal) and full-time fishers operating from shore or small fishing vessels. It should be noted, however, that export has increased over the past two decades as a result of greater market integration and globalization, and can be part of the small-scale fisheries scene.

Although small-scale fisheries have often been thought of a discrete category in a fisheries sector sense, there is increasing evidence that this approach is not particularly relevant in many cases. There is in fact a continuum of fishery types that can be thought of as spectra along various dimensions. The main dimensions are the amount of capital being invested (ranging from none to fairly large-scale investments), the time involvement of the participants (ranging from part-time to full-time), the size/value of the stock being fished, the type of technology being used (including vessel size), the use of the product (ranging from subsistence to commercialization/profits), and the type of management regime. Small-scale fisheries will cluster at the lower end of all these dimensions.

In many countries, the people involved in this subsector are extremely poor and are unable to influence their operating constraints. As a result of increasing population numbers, rapidly expanding fish markets and improved harvesting technology, the pressure on fishery resources and aquatic ecosystems is increasing, and the status of the resources and associated ecosystems in many countries is thought to be seriously degraded with an overall trend for further deterioration. Indicators of over-fishing including declining catch per unit effort, widespread use of destructive practices (such as dynamite and cyanide fishing), declining size of fish caught and changes in the species of fish caught. This is being exacerbated by increasing degradation of fish habitats by coastal development, pollution, deforestation and siltation. Conflicts, both between different gears within the subsector and between small-scale and large-scale fisheries are increasing and the social instabilities, as evidenced by the break down in law and order and increased violation of rules and regulations, has resulted in declining quality of life in terms of health, education, crime, nutrition and the treatment of minorities. In many cases, the increasing conflicts, low compliance and declining resource base results in increased marginalisation of people involved in the subsector and mitigates against changing the status quo. Governments have often withdrawn support for managing the subsector through perceived poor investment of government funds.

At the twenty-fifth session of the Committee on Fisheries (COFI), members requested FAO to provide more support for sustainable small-scale fisheries and to promote their better inclusion within the formulation of poverty reductions strategies. In particular, it called for FAO to *elaborate technical guidelines on increasing the contribution of small-scale fisheries to food security and poverty alleviation* and to also *develop an adopted [adaptive] ecosystem approach to fisheries tool box on small-scale fisheries [words in brackets are my interpretation of the original wording].* This COFI recommendation arose from a fuller ACFR that called for case studies on a range of fisheries in developing and developed countries to learn how the ecosystem approach to fisheries can be used in practice, and to use the case studies to build a toolbox of scientific and management approaches, including such tools as rapid appraisals, participatory research and data gatherings, conflict resolution tools, integrated resource management training, community-based and co-management, information sources, monitoring, evaluation and feedback.

Conceptual framework for understanding small-scale fisheries

There are a large number of papers and reports relating to the issues inherent in the development and management of small-scale fisheries. Béné[ref 2] provides a useful summary of the literature as it relates to small-scale fisheries and poverty. He paraphrases the two main paradigms that have been advocated in the recent literature on poverty and fisheries as: (i) "they are poor because they are fishermen" and (ii) "they are fishermen because they are poor" (see Figure 1).

The first paradigm in Figure 1 is called *conventional wisdom* and relates to the open access nature of fisheries that allows more and more people to enter the fishery which, because of the "tragedy of the commons" leads to economical (and often biological) overexploitation of the resource, the dissipation of rent and finally impoverishment of the fishing community. This is the classical Malthusian concept of poverty: overexploitation of the resource results in low catch, which equates with low income and poverty. From this perspective, therefore, the problems lie solely within the fishery subsector itself and the solution is better fisheries management.

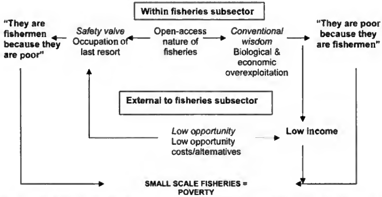

Within fisheries subsector
"They are fishermen because they are poor"
Safety valve
Occupation of last resort
Open-access nature of fisheries
Conventional wisdom
Biological & economic overexploitation
"They are poor because they are fishermen"
External to fisheries subsector
Low opportunity
Low opportunity costs/alternatives
Low income
SMALL SCALE FISHERIES = POVERTY

Figure 1: Relationship between small-scale fisheries and poverty as conceptualised in the literature (redrawn after Béné (2002))

The second is the *low opportunity* paradigm. Poverty is explained by using the concept of low opportunity incomes due to the lack of alternative incomes outside of the fisheries subsector that drives (or keeps) fishermen's income to a low level. Thus, the causes of poverty lie outside the fisheries subsector and the solution is to improve the economic situation outside the subsector. In this scenario, it is important to note that a small-scale fisheries subsector, is extremely mobile with people moving into and out of fishing, both seasonally and over longer time spans, depending on the relative attractiveness of other activities compared with fishing at any given time.

Linking these two paradigms creates the perception that fisheries, because of their "open-access" nature, as well as lack of alternative opportunities, often offer employment of last resort. Some see this *safety valve* aspect of small-scale fisheries as a desirable aspect and not necessarily an undesirable attribute as espoused by the *conventional wisdom*. All these arguments, however, end up with the same conclusion that "small-scale fisheries = poverty".

Béné (2002 and pers. comm.) and others (eg Allison, pers. comm.) are currently examining the extent to which the hypotheses linked to the two paradigms are verified by empirical data. This is a high priority research topic (see below – issue 2), but regardless of the outcome, Figure 1 does serve as a useful conceptual model to examine strategies to improve the contribution of small-scale fisheries to sustainable development, and allows the issues to be thought of as those (i) within the fisheries subsector and (ii) outside of the fisheries subsector, noting that both have to be addressed to make any significant progress.

2. RESEARCH AGENDA

The first section of this paper addresses the first ACFR recommendation and presents a framework to facilitate the development of a research agenda that will assist FAO implement its strategies for increasing the contribution of small-scale fisheries to human well-being and sustainable development. It does this through identifying the key issues and options for improved management in the context of multiple uses of marine, estuarine and inland waters and the ecosystem approach to fisheries, with special emphasis on poverty alleviation and food security in developing countries and provides discussion points for elaborating a draft research agenda.

Some issues highlighted below are external to the fisheries sector but impact on it, while others need to be dealt with within the sector itself, and yet others span across both. In order to provide a framework for the development of a research agenda, the issue is first described, activities and interventions currently in place to address the issue are then briefly presented and the research needs associated with the issue presented as a basis for further discussion by the Working Party.

2.1 Issue: Effectiveness of development policy to small-scale fisheries

Over the past 50 years a significant amount of development aid sponsored by national, bilateral and multilateral funding has been provided to raise the standard of living of small-scale fishers and their communities in developing countries. No recent estimates are available but an earlier estimate reported a total of US$3.73 billion in the period 1974-85. FAO currently has projects that involve small-scale fisheries valued at US$80 million (Neiland[ref 3]).

During the past decade or so, development policies and thus, the focus of development aid have changed radically. Originally the dominant policy favoured structural adjustment in the form of trade liberalization, deregulation and stabilization, in which it was assumed that the poor would benefit along with other sectors of society. More recently, the need to focus more directly on combatting and eradicating poverty has been realized, although initially, poverty was considered as a fairly simple concept that could be measured by a single economic indicator, such as the international poverty line of US$1/caput/day. It is now accepted that poverty is a complex issue characterized by low income, poor health, low literacy levels, under-nutrition, inadequate housing and living conditions. It is also extremely dynamic with people moving in and out of poverty, and it is highly correlated with social exclusion, marginalization, vulnerability (susceptibility to falling into poverty) and lack of power. This focus on poverty eradication was further endorsed at the recent World Summit on Sustainable Development (WSSD) where a plan of action to halve the level of poverty by 2015 was adopted (as measured by income, level of hunger and access to safe drinking water)[ref 4].

The main aim of most interventions in supporting these changing policies for small-scale fisheries over the past two decades was to promote "fishery development" based on the assumption that these interventions would lead to poverty alleviation and increased food security. Interventions have included:

- improving technology (both gear and fishing vessels);
- improved post-harvest processing and marketing;
- provision of credit;
- improving fishery management through allocation of user rights and access control;
- re-allocation of fishery resources (e.g., between small-scale and large-scale fisheries);
- enhancing fishery resources through restocking;
- increasing aquaculture to relieve pressure on capture fisheries;
- improving resource and environmental conservation measures;
- focusing on management through community-based initiatives;

- adopting new participatory and co-management approaches;
- training and capacity building;
- raising awareness of the importance of the contribution of small-scale fisheries to livelihoods, food security and quality of life;
- increasing economic growth and providing a wider diversity of employment and livelihoods, and
- providing more recently assistance in setting policies with their supporting legislation and institutions.

In general, the consensus is that these interventions have not been that successful with respect to small-scale fisheries (with some exceptions), although the causes of failures are very varied and range from poorly formulated policy to poor implementation of strategies, poor monitoring and lack of follow-up. It is, therefore, not possible to conclude that the intervention itself was not worthwhile. However, history has clearly demonstrated that because poverty and the causes of poverty are extremely complex, it is apparent that they can not be addressed by simply transferring technology and capital investments and that an integrated set of interventions is needed, not just one or the other. For example, if overfishing is the problem, restocking may be an option, but this would need to be complemented with seeking supplemental livelihoods and re-directing fishing through some incentive scheme during the period of stock rebuilding.

The changes in development policies have tended to come about through trial and error but they have far-reaching effects. As well as direct influence in terms of supporting various interventions, the dominant paradigm of the day also serves to set national policies and their incentive and disincentive schemes. For example, based on some of the earlier "fishery development" interventions, many developing countries are either subsidizing large-scale fisheries to promote their development at the expense of the small-scale subsector, or assisting small-scale to adopt more modern technologies in the belief that they will then become more "modernized" larger-scale operations or, in some cases, even subsidizing both.

In fisheries, policies that have promoted increased economic growth at a national level have tended to favour the development of large-scale approaches over small-scale ones and the resources being concentrated in fewer and fewer hands. There is some indication that during periods of sustained economic growth (e.g. in Asia), the level of poverty has reduced, but these findings tend to be based on simple economic indicators (e.g. income/caput/year) at the global level, and there is very little information on how changes in economic growth affect poverty in fishing communities. Some countries have shown rapid economic growth but have not shown corresponding improvements in human well-being, as measured through one or other of the accepted poverty indices. It is obvious that in countries where policy implementation is poor and where the power is concentrated in the wealthiest section of the society, the flow-on effect to the poor will be negligible.

Interventions that have attempted to establish some sort of property rights for the fisheries, followed by appropriate management and governance systems have had more success, although they often fail when local conditions and constraints have not been taken into account and linkages between national policy and on-the-ground management objectives not tightly linked. An important success criteria should be that they become sustainably funded from rents generated in the fisheries and not dependent on development aid. This has rarely occurred.

Research implications

The major research question is to what extent the current paradigm of development policy takes into account the nature and characteristics of small-scale fisheries, especially the common property nature of the fishery resources, the fact that they are renewable but limited, and that they are part of a complex web of multiple uses and users. In terms of poverty alleviation, are small-scale fisheries a useful entry point at all? Do they have any real capacity to reduce poverty and if so, which of the above interventions have worked best and why? Many causes of previous failures will be found, including whether a particular intervention was based on an inadequate analysis of the causes or whether it was fragmented in nature and aggravated rather than being fixed problems etc. Research could possibly provide better overall analyses of these approaches to guide future development assistance.

Research on the objectives, approaches and impacts of donor-funded projects operating within the current development policy paradigm should enable a better understanding of the socio-political circumstances, the policy and legal frameworks and the local conditions in which interventions are likely to succeed or not. Review and analyses of project and programme evaluations should also provide some insights into the causes of failure and point to alternative approaches.

A follow-up question is whether the modern development paradigm of focussing on poverty reduction will yield better results than some of the old paradigms, especially basic fisheries management paradigms. Many texts, including the Code of Conduct for Responsible Fisheries (CCRF) and its international plans of action (IPOAs) advocate a reduction in fishing effort and capacity to increase the yield from the resources and gain improved economic and social benefits. Should the development focus all be directed towards finding ways to remove excess fishers and vessels from small-scale fisheries? Are there are other interventions that could be more successful, especially if they include capacity building and handover of processes to existing institutions? More socio-economic research should be carried out to better understand the links between macro economics and livelihoods. This coupled with indicator development should provide a better analysis of what is often not revealed in the common practice of simply reporting on economic indicators. It will obviously need to include studies on the distribution of wealth in both developing and developed countries and build on the work of the many publications already published on this topic. Very few of these, however, focus on one or other of the resource sectors and there are few devoted to looking at small-scale fisheries, how they are structured and how power is distributed.

2.2 Issue: Measurement and understanding of the causes of poverty as it relates to small-scale fisheries

Although Figure 1 provides a convenient conceptual framework for small-scale fisheries and their link to poverty, all the ideas embraced in this model are based on various hypotheses and assumptions that have been recently questioned. For example, some recent research suggests that most small-scale fisheries have some degree of access restrictions and are not necessarily characterized as being the employment of the very poor, or, in fact, the activity of last resort. Because development policies on poverty and poverty reduction are based on these perceptions, as noted by the third session of the ACFR, a top priority is to obtain a better understanding of the nature, causes, dynamics and extent of poverty as it relates to small-scale fisheries.

Improved methods for measuring poverty are developing quickly. A number of single indicators of poverty that focus almost exclusively on the health, the education, or income have been advocated as a measure of the extent to which the inhabitants of a country are experiencing poverty. A number of composite indicators have also been developed that allow several indicators to be aggregated together to give a more general measure of poverty and living standards. The United Nations defines poverty as "denial of choices and opportunities most basic to human development – to lead a long healthy, creative life and enjoy a decent standard of living, freedom, self esteem and the respect of others" and advocates the use of a Human Poverty Index (HPI) that is aimed at measuring the level of deprivation and poverty being experienced in a country. There are two HPI indices most commonly used; one for less developed countries and one for the rest.

It appears that although these indices exist, there are very few studies that focus on assessing and identifying the extent, nature, causes and dynamics of poverty in situations where small-scale fisheries are involved (Macfadyen and Corcoran ref 5).

Research implications

The Sustainable Livelihoods Approach (SLA) is a useful analytical tool that can be used to understand fisher communities, their level of dependence on the fish resources, their ability to engage in alternative livelihoods activities as well as the broader legal and institutional constraints in which they operate. It is a multi-sectoral approach based on participation of the stakeholders that makes it particularly relevant to identifying the nature and causes of poverty in the context of small-scale fisheries. It should be able to test some of the hypotheses advocated over the years. For example, is small-scale fishing an "activity of last resort", to what extent are the resources "open access", etc?

By design, SLA is usually applied in situations where one is dealing with geographically small units. The development of realistic participatory poverty measurement methodologies that can be used to evaluate poverty-reduction policies across broader scales will also be needed. Related techniques used include Participatory Poverty Assessments, Well-being Analyses, Poverty Mapping, Wealth Ranking and Poverty Profiling. The sectoral approach outlined in the FAO technical guidelines on developing a set of agreed indicators to evaluate how fisheries contribute to sustainable development (FAO [ref 6]) could provide a complementary methodology but needs to be tested in the context of small-scale fisheries.

Development of these methodologies will assist in answering important questions such as: What is the proportion of people in transitional and chronic poverty in small-scale fisheries. How are different members of the community affected? What are the main contributing factors to poverty, and what type of policy intervention is necessary to address them.

Macfadyen and Corcoran[ref 5] list a large number of other areas requiring further research within the SLA framework including: better analyses of the linkages between different types of assets; increasing the value of information, especially that derived from traditional and local sources; understanding cross-sectoral linkages as well as more research on the process itself in terms of obtaining better participation and links between SLA and other more traditional economic appraisal techniques.

2.3 Issue: Competing policy goals

A key factor in strengthening governance and institutional support for small-scale fisheries will be to assist countries in resolving the competing policy imperatives of:

(i) optimal and sustainable use of fish resources and their supporting ecosystems;

(ii) economic objectives, especially in relation to either small- or large-scale fisheries;

(iii) social objectives, including maximizing employment and improving livelihoods;

(iv) objectives related to equity, including access for only small-scale fisheries, and

(v) any other objectives (for example trade liberalisation, market access etc.) which may impact on this subsector.

Very few fisheries, either large-scale or small-scale have adequately considered and resolved the trade-offs among these objectives that need to be agreed upon in setting clear policy in which fisheries management can be framed. For example, trade-off agreements need to be reached on:

- equity vs. efficiency;
- maximizing sustainable yields (and economic benefits) vs. widespread employment and providing a safety valve for the poor;
- export-oriented production vs. national food security;
- imports vs. national production;
- large-scale vs. small-scale fisheries;
- long- and short-term management goals;
- market liberalization vs. protection of small-scale fisheries, and
- foreign fishing vessels vs. local fleets.

In fisheries, this lack of clarity with respect to the objectives often leads to conflict among competing subsectors (e.g. small-scale fishing vessels vs. large-scale fishing vessels) resulting in many management interventions implemented to fix the symptoms, not the problem itself.

Research Implications

Many countries in the world have agreed to a number of high level principles relating to fisheries and ecosystem management (e.g. the CCRF). Within these principles, however, decisions need to be made on how countries are going to address the issue of poverty in the context of small scale-fisheries.

Policy and decision-makers require some sort of decision support system based on cost/benefit analyses to make the necessary trade-offs, coupled with data collection activities to monitor and, if necessary, modify decisions. For example, how do the potentially high costs associated with small-scale fisheries management compare with the cost of resource depletion, loss of employment, income and food security, both in terms of economic and societal values, if no management system was in place? What compensation might be necessary to reduce fishing capacity of large-scale fisheries (e.g. buy-back scheme) and how does that compare with the potential benefits that may be derived from the small-scale fisheries? One approach to answer these questions and scenarios is to develop fairly well-elaborated models of the system and input of, at the very least, basic economic data to gauge benefits and costs under different scenarios. However, useful results could also be achieved through the sharing and exchanging of existing experience and knowledge, the so-called participatory research approach. More work is needed to examine the impacts (particularly social impacts) of policy such as supporting aquaculture as an alternative to fisheries management. The approach also needs to involve the broader sets of policies such as trade policies that impact on small-scale fisheries and which could play a major role in changing the status quo. These research findings need to be fed back to the policy-makers.

The FAO Technical Guidelines on Fisheries Management and the Ecosystem Approach to Fisheries (Supplement 2)$^{\text{refs } 7,8}$, recognizing that these sorts of decisions and trade-offs are difficult to make at the higher policy level, and recommends that the best approach to the paradox of competing objectives is to adopt a participatory approach to translate the higher level policy goals into operational objectives at the fishery level and resolve conflict with the stakeholders in terms of how the fishery can best contribute to sustainable development at the level of management interventions. This recommendation needs to be explored in the context of small-scale fisheries.

More institutional and legal research is needed to provide better advice on how to set up successful institutional and legal frameworks. The FAO currently has a compendium on fisheries legislation but it is incomplete and out-of-date. If these databases were updated, analyses of these data could lead to better guidelines on how to construct legislation to support small-scale fisheries and how draw up complementary law to support traditional law and government policies, such as decentralization.

2.4 Issue: Profile of small-scale fisheries in national policies and international development initiatives

Small-scale fisheries are often marginalized and ignored in national and regional planning and policy development. Recent analyses have shown that many of the national Poverty Reduction Strategy Papers (PRSPs) that are being developed do not, in general, include small-scale fisheries and given the importance being placed on these documents, this is a serious concern. Two sub-issues are important here: (i) inadequate information; and (ii) lack of understanding of the overall policy and planning processes to be able to influence decision-makers, even if adequate information was available.

There are many statistics on the contribution of small-scale fisheries but all are qualified in that they are not accurate. The basic statistics are often informed guesses, or in many cases simply not collected at all. Most fishers are not licensed and operate on part-time or seasonal basis. A large number are also involved in the processing, marketing, transportation and other service sectors. Coates$^{\text{ref } 11}$, for example, demonstrated that the total world figure of 4.5 million people employed in inland capture fisheries was easily exceeded by an in-depth study of eight countries in Asia alone. Data collected from projects conducted in the Mekong Delta indicate that the production is several time higher than that officially reported. Similar project information from the coastal waters of the Philippines and Viet Nam suggest that actual production may be as much as three times that reported. Seilart$^{\text{ref } 12}$ calculated that on the basis of census data for the Philippines up to half of the whole population of that country were involved in some way in artisanal fisheries, a figure that underlines the importance of artisanal fisheries to the rural poor.

However, even if we rely on these underestimates, it is clear to see that small-scale fisheries provide significant employment, household income and food for a large percentage of the world's population. Of the top seven fish-producing countries, five are developing countries. Three of them (China, India and Indonesia) have populations of nearly 1 billion people living below the UNDP poverty line of US$ 1 per day. It is currently estimated that the global fisheries production has reached 130 million tonnes in 2000, 36 million of which is produced in aquaculture (FAO[ref 9]). Current figures suggest that artisanal, small-scale fisheries contribute more than 25 percent of the world's catch and account for more than half of the world's direct human consumption (FAO[ref 10]). It is also estimated that there are at least 35 million people employed in the marine and fresh-water production components, of which 80 percent work in Asia and approximately 80 percent of these are small-scale or artisanal fisher folk. In terms of GDP, however, the small-scale subsector is a minor contributor.

There are many reasons that could be put forward as to why small-scale fisheries have tended to be overlooked and marginalized over the years, despite the overwhelming evidence that they are important. The first is the institutional make-up of the ministries and departments themselves, which has often been based on those of developed countries (for example, fisheries are often only a small section of a larger agriculture department). The backgrounds senior staff and Minister are often in agriculture and fisheries have not been part of their training or past experience. A further reason is that, small-scale fishers are often from the lowest economic strata and have little voice, except when there are crises.

Policies are often economically driven and, as and because small-scale fisheries are insignificant contributors to GDP, they are largely overlooked. Commercial fisheries are seen as a source of tax while small-scale fisheries do not attract much public attention and remain relatively unknown. On the political front, attempts to impose management regulations on small-scale fishers often leads to unfavourable political exposure due to the perception that the livelihoods of the poor fisher are being threatened.

In general, small-scale fishing is perceived by planners and policy- and decision-makers as a subsector that takes care of itself. A long-held view (still held in some countries, especially in Latin America) was that these fisheries could be "modernized" and the larger-scale commercial fisheries have been systematically favoured in the belief that the benefits derived from the newer fisheries would flow through the economy to the original participants. Another mis-directed policy has been that aquaculture will grow at such a rate that it will be able to compensate for the reduced supply of fish resulting from poor management and again the original participants would be better off by taking up fish farming. However, despite these efforts, small-scale fisheries have not been displaced in either developed or developing countries. In fact, there are now more small-scale fishers producing protein for human consumption than ever before and the need for solutions to the many issues is even more urgent.

Research implications

Two related research needs arise from this discussion. The first is how to measure the contribution small-scale fisheries (addressed in section 3 in more detail below) and the second is policy research to gain a better understanding of why small-scale fisheries are often ignored in policy development and implementation processes.

It is obvious that better estimates of the contribution of small-scale fisheries are urgently needed. Conventional methods of sampling and data collection as used to collect information on large-scale fisheries are impractical or too expensive to apply to the very widely dispersed fishing communities and markets throughout the world. They also focus on one sector – fishing and tend to overlook the multiple use and multiple user nature of aquatic resources.

Several hypotheses as to why small-scale fisheries have tended to be ignored in the past are put forward above. Much more work is needed to test these hypotheses, identify the real reasons for their marginalization and seek mechanisms for integrating this subsector into mainstream policy and planning processes. The role of the different government of non-government agencies, especially national and local planning bodies needs to be much more clearly defined, in the context of aquatic multiple use and developing country's poor governance.

2.5 Tailoring fisheries management to small-scale fisheries

It is well-recognized that fisheries management based on scientific information, stock assessments and controls on the harvesting of target resources (with appropriate monitoring and enforcement) that has formed the basis of fisheries management in the northern hemisphere (and more recently transferred to the southern developed countries) is often not applicable to small-scale fisheries that are multi-geared, multi-species and characterized by a mobile group of harvesters. In general, it is concluded that this type of management is too expensive, too uncertain, and not practical.

Despite this, fisheries managers in developing countries have typically looked to the fisheries science emanating from developed countries for solution to their problems. Among these managers, there is still a widely held view that management and management planning cannot proceed until the stocks have been assessed, yield estimated and management reference points in terms of catches and fishing mortality have been established. This approach has been re-enforced by the training and extension programmes supporting formal stock assessment through LSFA (length frequency stock assessment and ELEFAN (electronic length-based assessment analysis). However, in most small-scale fisheries, this approach is simply not applicable or practicable and has delayed the introduction of fisheries management based on setting management objectives supported by a broad range of research to assist in policy formulation and broader fishery assessments.

Noting the failure of these more conventional fisheries management approaches, especially in developing countries, a range of alternative approaches have been advocated. These include:

- broader systems approach within the fisheries sector (e.g. ecosystem approach to fisheries);
- integration of natural resource management across sectors (e.g. integrated coastal area management, sustainable livelihoods, and large marine ecosystems);
- decentralization and participation at the community level (co-management);
- introduction (or in some cases re-introduction) of rights;
- area and time closures including MPAs and exclusion zones;
- improved governance systems;
- incentive-based approaches (not command and control) especially market access, and
- market-based approaches (e.g. certification and ecolabelling).

The introduction of one or other of these alternative approaches pre-supposes that the policy trade-offs have been made and legal framework exists to implement the required management. For example, applying a management regime that results in the re-allocation of resources through the introduction of access rights in whatever form, presupposes that there has been a decision made that the long-term increased ecological and economic benefits for the fishery as a whole outweighs the social disruption and un-employment that will result in the short-term.

Many of the alternative approaches would appear to be, in fact, much closer to the systems that existed prior to colonization. In many countries, these traditional approaches involving right-based access to the resources, rules and regulations governing their uses and an agreed set of sanctions have been made dysfunctional through the development of more central government control mechanisms. Some advocate the need to re-adopt some of these, but in the context of the modern more globalized world, dominated by increasing technology, markets and economic paradigms, this may not be appropriate. For example, in the inland fisheries of Bangladesh, when the state attempted to transfer property rights over fishing grounds through the fisheries co-operatives, it was the leasees (fish merchants and money lenders) that captured the right and benefited from the rent generated (Toufique[ref 13]).

Many case studies throughout the world have highlighted the problems associated with a top-down central management regime, especially in countries where the types of fisheries are extremely diverse, scattered geographically and employ large numbers of people. In more recent years a move towards co-management has lead to greater involvement of communities with the setting of management objectives, rules and enforcement/incentive schemes. However, in many of these cases the role and responsibilities of the different players (national governments, state/provincial governments, local governments/councils, communities, fishery organizations, individuals and NGOs) is often unclear and there is often a very tenuous link between central agencies and community activities. In addition, although governments may indicate support for co-management, they are often implemented without full adoption of the principles of co-management, appropriate regulations, administrative procedures and authority structures.

A broad range of measures will need to be considered including modified rights based approaches, (possibly including traditional rules and regulations), ecosystem-based measures such as Marine Protected Areas, stock restoration and integrated solutions looking to solve fishery issues through working in other sectors. Different approaches will need to be tried and tested through a process of learning and adaptation. Costly command-and-control systems will need to replaced with more incentive-based systems and Governments will need to invest in providing long-term benefits by compensating for short-term losses.

Research implications

A major research thrust needs to be applied in estimating the costs and benefits of any form of fisheries management in the context of small-scale fisheries. Again this requires clear policy goals on what management is trying to achieve but it should be possible to examine the costs and benefits with respect to both the social and economic dimensions. Research should lead to a simple "narrative" or message that says that if governments and communities invest say 10 percent of the money earned from selling fish into improving the management of the fishery, then they will benefit to the tune of 40 percent. This type of simple message could form the basis for change. Alternatively it could be put in terms of what would be lost if small-scale fisheries were not better managed. Even in subsistence fisheries, it will be necessary to demonstrate convincingly that reducing the number of fishers could result in an increase in the amount of fish available for food. This appears counter intuitive to most and it is difficult to argue against the commonly held view that an increase in the amount available for food will result if we have more fishers with more efficient gear.

There is a general lack of understanding on the effectiveness of all the alternative approaches but this could be gained through trial and error, given sufficient time. In one practical approach to speed up this learning process is, as recommended by the ACFR (endorsed by COFI for small-scale fisheries) to set up of a series of demonstration case studies where one of the alternative approaches (i.e. the ecosystem approach to fisheries) can be tested and used to develop a tool kit of science and management measures including rapid appraisal techniques, participatory research, and data gathering, conflict resolution tools, integrated resource management training resources, community-based and co-management, governance and institutional regimes, monitoring and evaluation of management performance and feedback.

Examining case studies where alternative forms of management have been implemented is another way of increasing our learning. For example, studying the socio-economic impacts of management on livelihoods of the fisheries communities (Jallow[ref 14]), examining strengths and weaknesses of different co-management approaches along the lines of Sverdrup-Jensen, and Nielkson[ref 15] and the World Fish Centre (WFC) (formerly ICLARM) and providing more information on how central government policy and institutions can be linked to the older more traditional approaches would be useful.

More basic social research is required to better understand existing social networks and traditional forms of management as a basis for developing alternative governance regime as has been recently considered across a number of countries by FAO[ref 17]. In particular, research on existing traditional management systems, even if such systems are now eroded by so-called modern systems, could also be useful in building better co-management. This might result in a better understand of changing power bases and incentives for certain types of behaviour, such as undermining the authority of traditional leaders and uptake of community-based fisher's organizations and the participation of fishers in planning and management.

2.6 Issue: Impacts of globalization and increased fish trade

Although globalization and increased fish trade is lauded by some as having many benefits in terms of national and global economies, it is also well known that inequities exist in terms of the beneficiaries.

One view of globalization, as supported by IMF and the World Bank, views it as a positive phenomenon. It argues that because the private sector is more efficient than the state, liberalization will lead to greater global competition that in turn will cause national companies to become more efficient. Globalization is seen as inevitable and unavoidable and national economies and institutions will have to adjust by making themselves more efficient. Since the market is (almost by definition) efficient, there is little or no need to regulate it. If a country does not benefit, it is suggested that the in-country policies need to be reviewed and institutions need to be reformed.

Globalization as seen by others as part of a process by which the rich developed countries in the northern hemisphere are attempting to retain the economic advantages and powers they enjoyed during the colonial era. Liberalization of finance, trade and investment has allowed the industrial countries' goods and firms to enter into and take over a significant portion of the markets of developing countries. Many warn of the dangers of the private sector replacing the state. The benefits and losses of globalization, therefore, are very unevenly spread and it is easy to see that the small-scale fisheries in developing countries may not be the winners.

Research implications

The extent to which these two paradigms is reflected in terms of small-scale fisheries warrants serious research. Better information on distribution pathways and market trends for fish products may assist policy decision-makers capture the benefits for all sectors of the economy and shield small-scale fisheries from adverse impacts.

Again with many of the issues addressed above, the issue of distribution of wealth is central to this issue and needs to be addressed. Other possible research topics include the extent to which international protocols and agreements protect the rights of the small-scale fisheries subsector and how agreements/protocols be reformed to address their concerns and vulnerability. Also interesting to ask is to what extent these agreements/protocols are complied with and how does the subsector feed into these international and regional policies processes and agreements.

2.7 Issue: Implementing the IPOAs on capacity and IUU fishing

The Johannesburg Plan of Action, a key outcome of the WSSD states that the FAO IPOA to prevent, deter and eliminate illegal, unreported and unregulated (IUU) fishing needs to be put into effect by 2004 and the IPOA on the management of fishing capacity by 2005. To date, the main focus of the IPOAs has been on large-scale commercial fisheries but many of the objectives and actions required apply across all types of fishing. Implementing these IPOAs in small-scale fisheries will require some form of customization in the small-scale fisheries context. For example, because many of the vessels engaged in small-scale fisheries do not come under a licence scheme, the term "illegal" is not particularly relevant. The issue of unregulated fishing/unreported catch (see 3 below) is wide-spread and should be central to the development of national IPOA plans and policies.

Implementing the IPOAS will also imply reconciliation of the many policy trade-offs considered above (for example, reducing capacity in small-scale fisheries would displace a large number of fishers who would require alternative employment/livelihoods). It is now widely recognized that the capacity (both labour and capital) in small-scale fisheries is excessive and it needs it to be reduced but if the social impacts are also unacceptable, how can this be done?

The second issue in implementing the IPOAs will be the impact on the small-scale subsector when they are implemented in large-scale fisheries. In theory, implementing the IPOAs should reduce the pressure on the world's fish stocks. However, if left to market forces, the open access nature of many fisheries could result in any benefits being quickly eroded by the displacement of large-scale fisheries to the detriment of the small-scale sector.

Research implications

In terms of the direct impact of implementing the IPOAs in small-scale fisheries, policy analyses are urgently needed to determine how the reduction of capacity and IUU fishing would impact on the socio-economic conditions of small-scale fisheries. We will also need to understand the indirect effects that removing IUU fishing and capacity in the large-scale fisheries will have on small-scale fisheries. The distributional pathways of the intended benefits will need to be understood and the costs and benefits more fully analysed.

2.8 Issue: Technological advances

Technological advances in fishing gear and fishing vessels have been one of the major goal in development aid policies in the past, although the introduction of technology without a better understanding of its impacts on limited natural resources, except in emergency situations is now being questioned. Other technological advances at the post-harvest stage, which enhance the value of the product or the working conditions of the fishers remain desirable and should be encouraged, based on better research and knowledge. For example, improved efficiency in small-scale fisheries post-harvest systems, marketing and the promotion of exports of products from small-scale fisheries could provide greater returns on the existing level of catch. Food quality and food safety, both in terms of their impact on price as well the risks for human health will continue to be a major issue and one that will increase in complexity as markets, especially export markets expand.

Research implications

A range of post-harvest technological research for more cost-effective solutions is needed, as well as research on the impacts and implications of post-harvest practices on the environment. Market research focusing on more efficient post-harvest processing, value-adding and distribution of products would be useful. Although much has been done in developing techniques for converting fish for agriculture and fish feeds, the Working Party should look at ways this can either be improved or implemented to support rural poverty and food security. Research into alternative ways of utilizing the catch is still needed.

3. EVALUATION OF THE ROLE AND IMPORTANCE OF SMALL-SCALE FISHERIES

The issue of how to undertake an evaluation of the role and importance of small-scale fisheries is discussed in this second section of this paper. Further details are included in the background papers "Contribution of Small-scale Fisheries to Rural Livelihoods in a Water Multi-use Context" and "Improving the Collection, Analysis and Dissemination of Information in Small-scale Fisheries".

Although small-scale fisheries are recognized as having a very important role as a source of employment, nutrition, food security and income, there is a serious lack of information regarding this subsector. The beneficiaries of small-scale fisheries are not just the fishers themselves but the contribution needs to be considered in the broader context of:

- employment and associated financial and food security benefits for participants;
- financial and food security for the dependents of participants;
- food and nutritional benefits for end consumers
- employment and associated benefit for those involved in related services, and
- national taxation and export revenues.

In this context, the contribution of small-scale fisheries needs to be examined at both a macroeconomic level and at a community level.

In the past, attempts have been made to estimate the importance of small-scale fisheries using measures and methods developed for large commercial fish stocks that are landed in a small number of landing sites by a relatively small number of people who often have to provide the information as part of some sort of management system. Based on this conventional approach, the role and importance of the subsector has been examined by trying to estimate:

a) total catch;

b) number, age and gender of people employed in harvesting and processing;

c) income of the harvesting and processing sectors;

d) amount of fish supplied for direct consumption (i.e. not sold);

e) amount and value of fish sold locally;

f) amount and value of fish exported/imported;

g) total amount of fish consumed;

h) nutritional value of fisheries products in diet;

i) social and cultural importance of fisheries (e.g. life style, religious linkages, etc).

However, the complexity in terms of the multiple uses and users of the resources, as well as the geographical spread of the subsector makes this traditional sector approach very difficult logistically and statistically to implement without an enormous budget and personnel. It is no wonder, that there is a general lack of information. What is available at a national level is also difficult to access, even from national government offices and is often unreliable. Some data sets collected at community level are available, but these are often associated with short-term aid projects and are not very useful at broader spatial or temporal scales.

The approach to evaluate this subsector needs to be broadened out to a more integrated assessment approach in which the contributions of different sectors need to be considered together. As pointed out in Béné's background paper, several complementary approaches are available (e.g. economic efficiency analysis, economic impact analysis and socio-economic surveys and sustainable livelihoods). What seems to be required is better coordination and closer working relations with the different Departments and agencies that collect data as well as new innovative data collection techniques. A real network approach based on people with the skills, personal networks and time available to undertake this type of study will also be required. It will also have to be based on both quantitative and qualitative data.

Once the type of information needed by the various users has been developed, there are a number of ways the data could be collected. The survey techniques required for multi-sectoral socio-economic valuations have been used for agro-pastoral and ago-forestry systems now for many years, including poverty profiling, institutional analyses and multi-sectoral activity analyses.

Some ideas on newer approaches to data collection which might be considered in obtaining the necessary information are presented below.

Use of co-management partners

Provided the right incentives are provided, the non-government partner in a co-management endeavour is often in a better position to collect and make available basic data on landings and other information useful for management. An excellent example is provided by the DFID-funded Integrated Lake Management in Uganda where authority for management has been devolved to Beach Management Units who each have a data collection role and provide information back-up to Government. Fishery associations can be used to collate information from their members, fishing companies can be used to supply information to governments, and intermediate buyers and sellers usually keep good records that can be utilized.

Agriculture surveys

With the inclusion of appropriate fishery-related questions in national agriculture surveys, it may be possible to provide structural and other social and economic data on small-scale fisheries. Some developing countries are starting to apply these kinds of questions (e.g. In Viet Nam, answers to the question of source of income revealed that nearly 70 percent of households engaged in some fishery and aquaculture activities).

Household consumption surveys

Household consumption studies are increasingly used to estimate regional and/or national consumption of fish. Despite the difficulties in obtaining representative data, for example obtaining accurate data from women and children and other less-empowered minorities, these types of surveys show considerable promise. They can be coordinated with other sectors, thereby reducing costs and can have extensive coverage. The data can not only be used to estimate the dependence of rural communities on fish but can also be scaled up to give estimates of total yield.

Market surveys

Market surveys at landing sites (where fish is often first sold) as well as markets themselves can be used to give indications of value and can also provide data on trade, imports/exports, trends in the types of food landed, etc.

More details on use of these methods as well as some others are discussed for the Asian region in FAO Fisheries Technical Paper No. 401[ref 17].

In addressing this topic, the Working Party will have to decide whether the evaluation of the subsector should be a one-off snapshot of the contribution, or whether a longer-term strategic framework for monitoring trends in the future should be put in place. A good example of a one-off snapshot has recently been provided by Gameriro and Wilson[ref 18]. If a longer-term strategy is envisaged, this will need to complement the FAO strategy on the "Status and Trends Reporting in Fisheries", already endorsed by COFI (Evans[ref 19]).

4. WAYS IN WHICH THE TRANSITION TO RESPONSIBLE FISHERIES CAN BE FACILITATED, BEARING IN MIND THE DEVELOPING PARADIGM OF THE ECOSYSTEM APPROACH TO FISHERIES (EAF)

In the third section of this paper, the manner in which that the transition to responsible fisheries can be facilitated is considered. Much of the work covered by the Working Party under recommendations A and B above will result in ways to facilitate this transition and more details concerning EAF are given in the document "Promoting the Ecosystem Approach to Fisheries in the Context of Small-Scale Fisheries". The ACFR also provided considerable guidance on the way forward when it recommended:

- Under the guidance of a small steering committee, form cross-disciplinary teams to conduct case studies for a range of fisheries in developing and developed countries to learn how the ecosystem approach to fisheries can be used in practice, to help build capacity to use such an approach in different fisheries and to further develop the use of the approach.
- Using the case studies and other experience, build a toolbox of scientific and management approaches, including such tools as rapid appraisals, participatory research and data gatherings, conflict resolution tools, integrated resource management training, community-based and co-management, information sources, monitoring, evaluation and feedback.
- Disseminate the lessons learned from the case studies, make the tool box open, accessible and a source of knowledge and teaching through appropriate media (both face-to-face and through information technology).

FAO has now recently published their Technical Guidelines on the ecosystem approach to fisheries (EAF). EAF is the merging of the paradigms of ecosystem management and fisheries management in a fisheries context and, as such, seeks to address all issues relating to the management of a given fishery in a holistic manner, using a participatory approach. With complementary work being carried out using the Sustainable Livelihoods Approach (SLA), especially in countries where there is considerable experience and knowledge already built up, FAO can gain valuable experience which would be of assistance to all its members, especially developing countries.

In addition to the contents of the toolbox, more experience in policy analyses and institutional strengthening will be gained that will assist in directly building capacity in participating countries and also be of benefit to all through the dissemination of the toolkit.

Outputs/outcomes from such activities would include:

a) EAF management plans for selected fisheries;

b) staff and institutions of demonstration fisheries with improved capacity for EAF and implementation of IPOAs;

c) annual performance reports for selected fisheries (triple bottom line – ecological, social and economic);

d) summary of demonstration case studies – lessons learned;

e) tool box of management approaches.

It is envisaged that many donors and partner agencies could be identified for this type of practical approach and that FAO should take the lead to start the initiative.

From a research perspective, another major issue which needs to be addressed to ensure a smooth transition towards responsible fisheries is the issue of implementing and applying research results. Over a period of many years, a range of authors have commented on the large gap between research providers and research users, especially in developing countries and this was the subject of a special paper during the Fifth Fisheries Development Donor Consultation held in Rome, Italy, 22-24 February 1999 (Cunningham[ref 20]). It is widely recognized that research has not contributed as effectively as it could have done to supporting improved fisheries management and poverty reduction. As far back as 1992, a study of international fisheries research concluded that research was largely "disengaged from the needs of national development objectives and from policy needs in general".

Based on an analysis of the contribution of research to the sustainable livelihoods of artisanal fishing communities, Hussein and Zoundi[ref 21] identified the following actions to address this concern:

- strengthen the institutional, management and strategic planning capacities of socio-professional organizations in the small-scale fisheries subsector;
- strengthen or establish mechanisms for partnerships between research and fisheries communities;
- strengthen capacities of fisheries research institutions, and
- strengthen the contribution of fisheries research to policies and livelihoods(e.g. create liaison bodies bringing together representatives from research, policy makers and artisanal fishers.

In designing the Policy Advisory Programme (PAP) for the fisheries of Lake Victoria, the Strategy for International Fisheries Research (SIFAR) suggested that, in the long-term, a major improvement in the relationship between research and policy will probably need a change in the institutional arrangements and a change in the approach to research. It recommended the formation of an interface group to act as a facilitator between policy and research (a similar model has worked very successfully in Australia for a number of years). In its model the policy analysis would create a demand for certain types of information, which would be supplied by researchers. This information would certainly involve a greater emphasis on economic, social and institutional research and a greater participation of a full range of stakeholders in the research process, including developing research priorities, data collection and analyses and solutions for solving problems. This in turn would require more "action research" that would meet the client needs.

An important task of these liaison or interface units would be to explore and expand on the range of development narratives which underlie fisheries policy. For example, the standard narrative that explains that "increased fisheries production would lead to poverty reduction" could be countered by another narrative based on contemporary science that says "because natural systems all have an upper limit to their productivity, poverty reduction in fisheries depends on institutional change (e.g. more co-management), a re-distribution of benefits and alternative employment opportunities, rather than production increases".

Communicating science results requires the skills broader than those conventionally provided by fishery biologists who typically make up the bulk of the research organizations staff. Again the recommendations of the ACFR are relevant when they recommend the formation of multidisciplinary teams who would work with local counterparts in implementing the newly published EAF guidelines in a number of fisheries from developing and developed countries and then building a toolbox of appropriate management and science approaches. This could build on a number of field projects being implemented by FAO and partner agencies (e.g. SEAFDC). For example the ACP Fish II feasibility study being designed by FAO/SIFAR advocates the initiation of a structure to provide coordination, support and knowledge based on practical learning and capacity building. This could provide an excellent opportunity to provide a more "hands-on" capacity building environment based on learning and training to improve the fisheries management of a given range of demonstration sites.

The need for better communication and adoption of research should link strongly with the research agenda developed in the first recommendation, for without a way of implementing the new knowledge gained, any research agenda in the end simply becomes an academic exercise that may generate a large number of research papers but little else.

REFERENCES

[1] FAO. 2003. Paper COFI/2003/9 presented to the Committee on Fisheries, 25th Session – Rome, Italy 24-28 February 2003.

[2] Béné, C. 2002. Poverty in small-scale fisheries. A review and some further thoughts. 1950 *In:* Small-scale fisheries, poverty and the code of conduct for responsible fisheries. Report of an international workshop organized by CEMERE as part of the DFID/FAO Sustainable Fisheries Livelihoods Programme (SFLP) Cotonou. Benin. November 2001. FAO. Rome.

[3] Neiland, A.E. 2002. Fisheries development, poverty alleviation and sample-scale fisheries: a review of policy and performance in developing countries since 1950 *In:* Small-scale fisheries, poverty and the code of conduct for responsible fisheries. Report of an international workshop organized by CEMERE as part of the DFID/FAO Sustainable Fisheries Livelihoods Program (SFLP) Cotonou. Benin. November 2001. FAO. Rome.

[4] http://www.johannesburgsummit.org/

[5] Macfadyen, G & Corcoran, E. 2002. Literature review of studies on poverty in fishing communities and of lessons learned in using the sustainable livelihoods approach in poverty alleviation strategies and projects. FAO Fisheries Circular No. 979, 93 pp.

[6] FAO. 1999. Indicators for sustainable development of marine capture fisheries. FAO Technical Guidelines for Responsible Fisheries No. 8, 68 pp.

[7] FAO. 1997. Fisheries management. FAO Technical Guidelines for Responsible Fisheries No. 4, 82 pp.

[8] FAO. 2003. Fisheries Management: The ecosystem approach to fisheries. FAO Technical Guidelines for Responsible Fisheries No. 4, Suppl.2, 112 pp.

[9] FAO. 2002. The State of World Fisheries and Aquaculture 2002. FAO Fisheries Department. FAO, Rome. 150 pp.

[10] FAO. 1998. Integrated coastal area management and agriculture, forestry and fisheries. FAO guidelines, FAO Sustainable Development Department. FAO, Rome. 267 pp.

[11] Coates, D. 2002. Inland capture fishery statistics of South East Asia: Current status and information needs. Asia Pacific Fishery Commission, Bangkok. Regional Office for Asia and the Pacific. Publication No. 2002/11, 114 pp.

[12] Sielert, H. 2002. Regional synthesis on the current status of small-scale fisheries management in Asia. In: Interactive mechanisms for small-scale fisheries management – report of the Consultation, Bangkok. 26-29 November 2001. Regional Office for Asia and the Pacific. Publication No. 2002/10.

[13] Tofique, K.A. 1997. Some observations on power and property rights in the inland fisheries of Bangladesh. World Development No. 25. pp. 457-467.

[14] Jallow, A. 2002. The socio-economic impacts of different fisheries management strategies at local level. *In:* Small-scale fisheries, poverty and the code of conduct for responsible fisheries. Report of an international workshop organized by CEMERE as part of the DFID/FAO Sustainable Fisheries Livelihoods Programme (SFLP). Cotonou. November 2001. FAO, Rome.

[15] Sverdrup-Jensen, S. & Nielson, J.R. 2002. Co-management in small-scale fisheries: A synthesis of Southern and Western African experience. http://www.indiana.edu/~iascp/Final/raakjaer.pdf

[16] FAO & MRC. 2003. New approaches for the improvement of inland capture fishery statistics in the Mekong Basin. Ah hoc Expert Consultation. Udon, Thailand. 2-5 September 2002. 145 pp.

[17] McGoodwin, J.R. 2001. Understanding the cultures of fishing communities. A key to fisheries management and food security. FAO Fisheries Technical Paper No. 401, 287 pp.

[18] Gameriro, M.F.S & Wilson, J.D.K. 2003. The importance of marine fisheries to coastal community livelihoods in SADC countries. Final consultancy report. 12 pp.

[19] Evans D.W. 2001. Status and trends reporting in fisheries. A review of progress and approaches to reporting the state of the world fisheries. FAO Fisheries Circular No. 967, 74 pp.

[20] Cunningham, S. 2001. Towards the increased policy relevance of fisheries research. A discussion paper prepared for the Fifth Fisheries Development Donor Consultation. Rome. 22-24 February 1999. FAO Fisheries Circular No. 964.

[21] Hussein, K & Zoundi, J. 2003. The contribution of research to the sustainable livelihoods of artisanal fishing communities. Overview and final report of a study conducted in West Africa (Cameroon, Guinea, Mali, Mauritania, Nigeria and Senegal). Cotonou. Sustainable Livelihoods Programme in West Africa SFLP/FR/14, 49 pp.

2. CONTRIBUTION OF SMALL-SCALE FISHERIES TO RURAL LIVELIHOODS IN A WATER MULTI-USE CONTEXT (WITH A PARTICULAR EMPHASIS ON THE ROLE OF FISHING AS "LAST RESORT ACTIVITY" FOR THE POOR)

Christophe Béné

SUMMARY

Since the mid-eighties, the importance of small-scale fisheries in rural development has been widely recognized by academics, practitioners and development agencies. However, despite an increasing number of research and development programmes, the role played by small-scale fisheries in the rural development of coastal or riverine area communities is still poorly understood. It is in particular widely recognized that a more systematic framework is needed which could help to better evaluate the real contribution of small-scale fisheries to the sustainable socio-economic development of rural populations in developing countries.

The present document is an attempt to contribute to this improvement. In particular, its main objective is to address the question of the "Role of small-scale fisheries in multiple use of coastal, estuarine and inland waters". For this purpose, it relies essentially on an overview of the sectoral interactions between small-scale fisheries and the other rural activities and discusses how those interactions may affect the livelihood of fisheries-dependent populations in developing countries. A special emphasis on the potential role played by artisanal fisheries in poverty alleviation is made. For its largest part, the analysis is conducted from a Sustainable Livelihood Approach (SLA) perspective – although the principles of this approach are not detailed here.

The paper is articulated in four main sections, as follows. First, an overview on small-scale fisheries and livelihood of fisheries-dependent communities in developing countries is proposed. Using a livelihood analysis-based approach, we show how the contribution of fisheries to household livelihoods is not simply a function of the time (labour) involvement shared between the different members of the household but rather a function of the combination of fishing assets they have at their disposal (including the status of the local ecosystem and its fish stocks), and the rules and other socio-institutional mechanisms which govern the access and use of those assets. Combining the index of human involvement (investment of labour and/or human assets, e.g. skills) adopted in the conventional approach with an index of "capital" investment (physical and financial assets) allows us to build up a new two-dimensional framework which captures and illustrates in a more comprehensive way the very wide spectrum of contributions that fishing may offer as part of the households' livelihood strategies.

Second, the paper presents and discusses the issue of water multi-use and its impact on fishing activity and fishery-dependent communities' livelihoods. Based on a typology of interactions including 5 categories (conflict, neutral multi-uses, compromises, complementary uses and collaborations) we show through a series of case-studies that the water multi-use interactions taking place between the different water stakeholders are not systematically of conflictual nature. Of particular importance is the case of complementary interactions. The review of the literature reveals, however, that empirical studies analysing how these complementary interactions evolve are cruelly missing. The main reason for this gap is that fishery has been considered too frequently from a mono-sectoral point of view (both by scholars and deciders), despite the fact that the multiactivity-based livelihoods of most fisher-farmers of riverine or floodplain environments have been recognized for many decades. A series of conclusions are then derived, which identify domains of investigation for further research.

Third, the issue of valuation and information use in fishery policy is discussed. It is first recalled that the gap of knowledge and lack of proper valuation which characterizes small-scale fisheries in most parts of Africa, Latin America, and – to a lesser extend – Asia, is usually presented as the main constraint for the design of appropriate fishery policy, both at regional and national levels. It is argued however in this paper that this perception – which tends to explain the lack of appropriate policies and planning by the poor abilities of practitioners and academics to properly evaluate the true social and

economic values of small-scale fisheries-, hides another important dimension of the problem. The experience shows, indeed, that the generation of (more) information is not systematically a sufficient condition to support a more appropriate agenda setting and to ensure the implementation of successful policies. The impact of social/economic information generated through a better evaluation process is not merely determined by the quality of that information, but also to a large extent by the nature of the policy environment.

The second part of the section reviews the different valuation methods which are potentially applicable to the evaluation of artisanal fisheries, and discusses their respective rationales and limitations within a multi-uses, multi-users context. A specific emphasis is given in this review to the livelihood analysis approach, and in particular to how this recently developed approach fits into the more general socio-economic framework and how it may complete the other more conventional environmental economics methods.

Finally the specific question of poverty alleviation in small-scale fisheries is raised in the last section of this paper. More specifically, the role played by fisheries as an "activity of last resort" for the poorest is addressed and carefully discussed. First the prevalence of this paradigmatic perception is emphasized through a thorough review of the fisheries literature. Second a more in-depth analysis shows how this pro-poor capacity of small-scale fisheries to sustain poor people results in fact from the combination of two distinct mechanisms: (1) the "redistributive" dimension of fisheries, i.e. the fact that fishing activities appear very often to be of greater importance to the poor in terms of income, food security and employment than for the non-poor. Within this approach, fishing is considered as a fundamental "pillar" on which poor families facing chronic (long-term) destitution rely to sustain their livelihoods; and (2) the "safety-net" capacity of fisheries, i.e. the fact that in period of individual or collective economic crisis, fishing may also provide alternative or additional sources of income, employment and food for the households – poor and less poor – whose livelihoods have been temporarily reduced or affected by the crisis. Those two mechanisms are then analysed and discussed, and needs for further research associated to this role of "activity of last resort" are highlighted.

1. CONTEXT

Since the mid-1980s and, in particular, as a result of the works of Lawson (1977, 1983), Smith (1979) or Panayotou (1982, 1985), the role of small-scale fisheries in rural development in terms of food supply/security, income and employment has been widely recognized (see, e.g. FAO 1984, World Bank 1993). Drawing upon those initial works, a significant number of research and development programmes were implemented (mainly in Africa and Asia) in the 1990s which attempted to further investigate the importance of artisanal fisheries to the local populations (see for instance the multiple programmes carried out by the International Centre for Living Aquatic Resources Management (ICLARM) in Asia, the Integrated Development of Artisanal Fisheries (IDAF) programme implemented by FAO and the Danish International Development Agency (DANIDA) in West Africa, or the Traditional Management of Artisanal Fisheries (TMAF) programme funded by DFID in Nigeria). However, despite the great progress achieved through these programmes in describing and understanding the livelihoods of artisanal fishers, the position of small scale fisheries and how they fit into the more general, multi-activities rural economy remains poorly understood It is widely admitted for instance that a more systematic framework (or strategy) is needed to better evaluate the real contribution of small-scale fisheries to socio-economic development of rural populations in developing countries (FAO 2000).

It is in this context that the FAO Advisory Committee on Fisheries Research (ACFR) recently recommended the establishment of a Working Party on small-scale fisheries. The objective of the Working Party is to make recommendations for the management of small-scale fisheries, including a set of Technical Guidelines, to increase the contribution of small-scale fisheries to food security and poverty alleviation on a sustainable basis. To support production of the guidelines, a series of background papers was commissioned to highlight issues and experiences in small-scale fisheries.

This document is part of this set of background papers. Its main objective is to address the question of the "Role of small-scale fisheries in multiple use of coastal, estuarine and inland waters" (Theme No.1 of the Terms of Reference). For this, it will rely essentially on an overview of the sectoral interactions between small-scale fisheries and the other rural activities and discuss how these interactions may affect the livelihoods of fisheries-dependent populations in developing countries. A special emphasis is placed on the potential role played by artisanal fisheries in poverty alleviation. The analysis will be conducted from an SLA perspective.

Throughout the paper, the discussion – although largely illustrated with empirical case studies – will be articulated mainly from a conceptual point of view and focus on research issues. This approach greatly limits the relevance of the paper with regard to the day-to-day tasks of practitioners (e.g. Department of Fisheries officers). The Terms of Reference also requested to restrict the analysis to the context of developing countries, which induces that some lessons or experiences achieved in more advanced, industrialized countries (especially those in the domains of integrated coastal management planning and coastal zone planning) will not be considered in this study.

The paper is articulated as follows. After an overview on small-scale fisheries and livelihoods of fisheries-dependent communities in developing countries (section 2), the paper will present and discuss a list of issues related to the multiple uses of marine, estuarine and inland waters (sections 3 and 4). Where possible the paper will link those issues to current knowledge (or lack of knowledge) and relevant future research areas. Finally the specific question of poverty alleviation in small-scale fisheries will be raised (section 5). In particular, the role played by fisheries as an "activity of last resort" for the poorest will be addressed.

2. FISHING AS A LIVELIHOOD ACTIVITY IN RURAL COMMUNITIES

Worldwide, and in particular in developing countries, fisheries and fisheries-related activities (processing, trading, net-repairing, etc.) are a key-component in the livelihoods for millions of people. In West Africa, for example, it is estimated than over five million men and women depend on the use of aquatic resources for their livelihoods and millions more are highly dependent on the nutrition provided from fisheries and aquatic resources from coastal areas and extensive river and floodplain systems. In Asia the figures are even larger. In the Mekong delta only, more than 15 million people are estimated to depend on fisheries activities on a daily basis, either for income, employment or food supply. The majority of these people live in rural (sometimes quite remote) areas, where the living standard is recognized to be usually low or very low.

Analytical framework

It is usual to divide fisher households according to their degree of labour-involvement in fishing activities, and based on the conventional classification: professional, part-time and occasional fishers. However, such a division merges households that may have completely different livelihood strategies, and for whom fishing activities may play a completely different role within the overall range of activities undertaken by those households. This loss of socio-economic differentiation among fishing households can be analytically disabling, particularly when poverty is the primary concern.

Using the SLA approach could help to show how the contribution of fishing to household livelihoods is not simply a function of the time (labour) involvement shared between the different members of the household but rather a function of the combination of fishing assets they have at their disposal (including the status of the local ecosystem and its fish stocks), and the rules and other socio-institutional mechanisms that govern the access and use of those assets. From this SLA perspective, it is, therefore, necessary to 'widen' the approach through which the place of fishing activities in households' livelihood is analysed. This can be done by combining the index of human involvement (investment of labour and/or human assets, e.g. skills) adopted in the conventional approach with an index of 'capital' investment (physical and financial assets)[1].

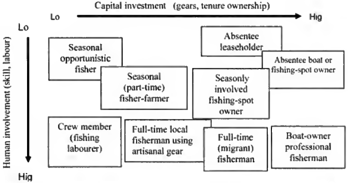

Capital investment (gears, tenure ownership)
Lo
Hig
Lo
Human involvement (skill, labour)
Hig
Seasonal opportunistic fisher
Absentee leaseholder
Absentee boat or fishing-spot owner
Seasonal (part-time) fisher-farmer
Seasonly involved fishing-spot owner
Crew member (fishing labourer)
Full-time local fisherman using artisanal gear
Full-time (migrant) fisherman
Boat-owner professional fisherman

Figure 1. Typology of fishing activities as a function of human involvement (skills, labour) and capital investment (gears, tenure ownership or leasing).

Using this approach, a new two-dimensional framework can be built up, which captures the very wide spectrum of contributions that fishing may offer as part of household livelihood strategies (Fig.1). These strategies may range from low human (labour) involvement combined with low capital investment, to a highly intensive labour activity and/or highly capital-based activity. Between those two extremes, a continuum of combinations exists which provide opportunities to thousands of people to include fishing activity as part of the overall range of activities they undertake to sustain their livelihoods.

Small-scale fisheries and rural livelihood strategies

The combination of low human involvement and low capital investment (top-left corner of Fig.1) corresponds to the strategy of opportunistic fishing undertaken by a very large number of households in developing countries, essentially for subsistence purposes[2]. This strategy involves cheap and simple fishing gear (e.g. baited fishing lines) and is frequently carried out by "non-leading" members of the household (children or elders, or sometimes adult women) in addition to the other domestic activities. This type of fishing is usually operated in an opportunistic way on the margins of the water-bodies located in the vicinities of the house/village. The purpose is almost exclusively for subsistence. In floodplain areas of the Indian subcontinent, this type of opportunistic activity may involve up to 70-80 percent of the households during the flood season (Thompson and Hossain 1998; Hoggarth *et al.* 1999). In West African villages on the coast, or in the vicinity of rivers (e.g. Cameroon, Burkina Faso) or lagoons (e.g. Benin, Ivory Coast), opportunistic (morning and/or evening) fishing, with other activities such as farming, household or agricultural commitments occupying the rest of the day, is very common (Horemans and Jallow 1997, Williams and Awoyomi 1998).

---

[1] This part is derived from an initial analysis proposed by MRAG (2001).

Seasonal (or part-time) fishing is usually characterized by a slightly higher labour and financial involvement. It is also operated by different members of the households: part-time fishers are young and/or mature males who get involved in fishing activities as part of a wider, multi-activity livelihood portfolio. They usually use relatively cheap and simple fishing gears (e.g. traps, gillnets, hook lines) although some more 'sophisticated' gear or techniques (e.g. fences or barriers) may be used as well. This type of activity can last from a few weeks to several months during the season, depending on the combination of activities undertaken by the households and the availability of labour and resources. The catch is used for subsistence purpose or/and sold on local markets. In Africa, along rivers or in the vicinity of water-bodies (ponds, reservoirs) the active males may get involved in this type of seasonal fishing activity between crops or when other agricultural activities are low (Thomas and Adams 1999, Sana 2000). In the Tonle Sap Lake area in the Mekong Basin, hundreds of thousands of households share their time between the fishing activity, operated on the open water of the lake and the fringing floodplains during the rainy season, and the cultivation of rice paddy and other subsistence and cash crops during the rest of the year (Ahmed *et al.* 1998).

In coastal areas, people may enrol as crew members on boats for a given part of the year, depending on the opportunities (or absence of opportunities) in other rural activities. This category of wage-based labourers, however, involves mainly full-time professional fishermen (young and/or mature males) who are working all year round on artisanal or semi-industrial vessels (Chaboud and Dème 1989, Chauveau, Jul-Larsen and Chaboul 2000). Their revenues are usually based on a share-contract remuneration system and the activity is mainly undertaken for income generation (although some part of the revenue may be paid in kind). This concerns a large number of men in coastal villages (or even urban areas) in Africa (e.g. Senegal, Ghana) or in Asia (e.g. Sri-Lanka, Philippines, Thailand, Viet Nam). Other members of the household may be involved in fishing-related activities (e.g. fish scaling, processing, trading) or other urban or rural activities (farming, home gardening or livestock rearing).

In small islands (e.g. Pacific or Caribbean), or in inland areas (around rivers, lakes or reservoirs), full-time local (resident) fishermen constitute a very large share of village populations. In East-Africa lake fisheries their number has been estimated to be several million. In coastal areas they also represent a large majority of the males who are not enrolled as crew-members. These full-time resident fishermen usually possess their own artisanal fishing gears and, for the most successful of them, one (man-powered or sometimes motorized) canoe or pirogue. They sell the largest part of their catch to local markets, although a share is usually kept for household consumption. In inland areas, conflicts are frequent between these fishermen and migrant full-time fishermen who usually operate on the same water-bodies and compete for the same resource(s) (Faye 1994, Kassibo 2000). These migrant fishermen, who have usually very efficient gears and high level of fishing skill, are generally the main vector of technological transfer in those remote areas. In the Lake Chad region for instance, the *goura* (or Mali trap) which can be used either as an individual device (trap) or in aggregation to form barriers across rivers or channels was introduced in the early 1980 by migrant fishermen from Mali (Quensière, pers. comm.).

---

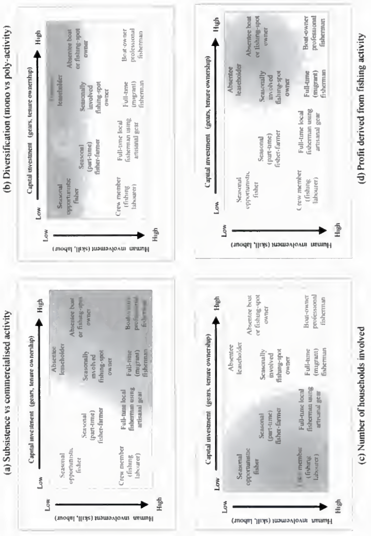
[2] In this document subsistence refers to an economic system adopted by households primarily organized around a domestic mode of production which depends heavily on natural resource harvesting and mainly geared towards home-consumption (i.e. not commercialised and therefore not income-generating).

At the end of the spectrum, characterized by high human involvement and high financial investment, are the professional fishermen who possess their own fishing gear and their own boat. They may operate individually but usually employ one or several crew-members (relative or non-relative males). This category of professional fishers is very heterogeneous ranging from the poor individual full-time fisherman on the Amazon river's tributaries who hardly makes enough profit to feed his family (Hartmann 1989) to the "Big Man", sort of fishing entrepreneur along the coast of Senegal or Congo who employs a dozen of men on 10-m pirogues and is connected to a well-developed, efficient (and sometimes international) commercialization system (Nguinguiri 2000).

Finally, high capital investments can also be combined with low human (labour) involvement (top-right). This is the case for owners of boats or expensive fishing gear (e.g. large beach seine) or individuals who have gained the control over the best 'fishing-spots' but are not directly involved in fishing activities. This category also includes absentee (local or urban) leaseholders who sublease their fishing rights, or contract local community fishermen. This situation can occur in marine and freshwater habitats (for boat owners), but is mainly found in floodplain areas where the spatial and seasonal heterogeneity of the habitat creates good "fishing-spots". The access to those very productive grounds (e.g. receding channels) is often restricted to the well-connected, better-off households, either institutionally -through asymmetric power-relationship – or economically – due to the very high entry cost (fees) which makes them unaffordable for the non-rich. Examples of such situations have been extensively described for Bangladeshi, Cambodian or Nigerian floodplains (e.g. Kremer 1994, Toufique 1997, Degen and Thuok 1998, Neiland, Jaffrey and Kudaisi. 1997).

In summary, the contribution of fishing activities to the livelihoods of rural poor and non-poor households may take a remarkably large number of various forms and involves a variety of different strategies. The use of the two indexes (human involvement and capital investment) represents, in that respect, an improvement over the more conventional approach which tends to characterize fishermen only by their degree of labour-involvement (professional, part-time and occasional).

However, as emphasised in the case of the full-time boat owner fishermen above, the degree of human and financial investments does not necessarily "explain" by itself the level of success (or failure) of the household and the extent to which involvement in fishing activities contribute to a household's well-being.


Capital investment (gears, tenure ownership)
Human involvement (skill, labour)
Low
High
Seasonal opportunistic fisher
Seasonal (part-time) fisher-farmer
Absentee leaseholder
Seasonally involved fishing-spot owner
Absentee boat or fishing-spot owner
Crew member (fishing labourer)
Full-time local fisherman using artisanal gear
Full-time (migrant) fisherman
Boat-owner professional fisherman

(a) Subsistence vs commercialised activity

(b) Diversification (mono vs poly-activity)

(c) Number of households involved

(d) Profit derived from fishing activity

Fig.2. Characterisation of small-scale fisheries using four attributes: (a) subsistence vs commercial activity, (b) the degree of diversification characterising the fishing households' livelihoods, (c) the number of households involved in fishing strategies worldwide, and (d) the profit derived from fishing activities.

Further characterization of small-scale fisheries

Four additional analytical "entry-points" can be included in the initial framework to complement the characterization of small-scale fisheries with respect to poverty alleviation and food security (Fig.2). These characteristics are: the occurrence of subsistence *vs.* commercialized activity (top-left diagram), the various degree of diversification (mono *vs.* multi-activity) characterizing the livelihoods of the fishing households (top-right diagram), the number of households involved worldwide in the different categories of fishing strategies (bottom-left diagram), and the degree of profit (financial return) derived from those fishing activities (bottom-right diagram). These features have been superimposed on the initial framework through gray scale shading gradients.

(a) In the top-left diagram, the occurrence of subsistence fishing (light shading) is represented along with the expansion of commercial fishing (darker shading). The review of the current literature suggests that the current marketization of the activity tends to restrict the occurrence of (pure) subsistence to the cases of low involvement and low investment activities. When human involvement and capital investment both increase, the degree of dependence on subsistence tends to decrease and an increasing share of the catch is commercialized.

(b) In the top-right diagram, the coloured pattern differentiates the mono (light shading) vs. poly-activity strategies (darker shading) adopted by the households involved in fishing. The shading illustrates that the level of financial investment is not a key-factor determining the degree of diversification at the household level. Both strategies – specialization (mono-activity) and diversification (poly-activity) – can be observed indifferently with low or high financial investment.

(c) The bottom-left diagram simply illustrates that the majority of the people (men, women) involved in fishing activities are occasional opportunistic fishers, seasonal fisher-farmers or fishermen who do not own their own boat (FAO 2003). On the other side of the spectrum, absentee leaseholders and households controlling or owning expensive fishing gears or fishing spots are comparatively very few.

(d) In the bottom-right diagram, the gradient illustrates the level of financial return derived from fishing activities (the light shading indicating low returns while darker shading shows high profits). The gradient is horizontal, indicating that the level of return is largely determined by the degree of financial investment and not by the level of human involvement. Those who can afford expensive gears or are socially or financially able to pay the formal and/or informal fees required to control highly productive fishing grounds are more likely to receive a higher return[3].

The comparison between this last entry-point (d) accumulation of profit and (c) -number of people involved in fishing activity is important from a poverty alleviation point of view. The opposition of gradient between the two cases suggests that for a very large majority of fishery-dependent households in the world, fishing activities cannot be considered as a potential source of high economic return. This contrasts with the fate of a few households who control the highly profitable part of the activity and for whom fishing represents a source of substantial capital accumulation[4].

3. THE ISSUE OF WATER MULTI-USE AND ITS IMPACT ON FISHING ACTIVITIES

Water, by its very nature, is a multi-use good. Notwithstanding its cultural dimensions, water is used for human needs (drinking water, domestic uses), economic activities (agriculture, irrigation, fishing or aquaculture, transport, hydroelectric power, etc.) or even as a depository for domestic or industrial wastes. Even if rigorous comparisons are difficult, an overview would rapidly indicate that coastal, estuarine, or inland areas do not face "equal" situations in terms of water multiple-use issues. Broadly speaking, the different elements and mechanisms influencing the degree of interaction between two or more water-related activities can be "encapsulated" into two major components: (1) the multiplicity of uses and (2) the degree of intensity of those uses.

---

[3] For illustration Kremer (1994) calculated that in the floodplains adjoining the River Meghna in North-east Bangladesh, during the receding season, the richer fishing households using very efficient and costly fishing techniques catch 2.5 times more fish by weight per household than their poorer counterparts.

[4] For illustration, in Cambodia where the fisheries of the Tonle Sap Lake has been estimated to support more than 1.2 million people, a recent FAO study revealed that in the year 2000, 80 percent of the dry season shoreline of the lake was controlled by only 18 men (Evans 2003).

Table 1. Multi-use of water in coastal, estuarine and inland areas

	Inshore salt water	Estuarine environment brackish-water	Inland areas fresh water
Direct uses	Fishing activities Tourism activities (diving, sailing, etc) Recreational activities Mineral extraction Transport Coastal aquaculture	Fishing activities Brackish water aquaculture Transport Recreational activities Mineral extraction	Fishing activities Fresh-water aquaculture Domestic uses (drinking, washing) Livestock Agriculture (irrigation) Power generation (electricity) Transport Dams Mineral extraction Recreational activities Flood control Water transfers
Indirect uses	Domestic and industrial discharges Conservation (protected area) Urbanization	Domestic and industrial discharges Conservation (protected area) Urbanization	Domestic and industrial discharges Conservation (protected area) Urbanisation Forestry

3.1 Multiplicity of uses

Globally, even if it is difficult to draw any pertinent generalization due to the very local-specificity of water multi-use interactions, some trends can be identified. In particular, the number of direct and indirect uses globally increases from coastal (inshore) to estuarine areas (including river delta, mangrove, lagoon, etc.), and from estuarine to inland areas (rivers, reservoirs, lakes, ponds, floodplains) (Table 1). This increasing trend essentially reflects the fact that all direct uses, except power generation and transport, are strongly related to the salinity degree of the water in the area considered – salt water in coastal area; brackish-water in estuarine environment; and freshwater in inland areas – and in particular that animals, human beings, and most agricultural plants need fresh water for their development.

3.2 Intensity of use

The major driving forces determining the intensity of water use are: (a) population pressure and (b) degree of economic development. Population pressure varies from one continent (country) to the other. A comparison between Asia and Africa for instance is almost meaningless, given the tremendous difference that exists today between those two continents in terms of population density (203 *vs.* 64 person/mile^2 respectively). This difference is further exacerbated by the discrepancy in economic development.

Within continent (or country) the intensity of water-use also varies between inshore, estuarine and inland areas. In most places, estuarine waters are usually characterized by high population density (e.g. Mekong delta, delta of the Ganges, Nile delta) and therefore is likely to be characterized by the highest intensity of use, followed by inland and coastal waters.

3.3 Pattern of interactions

The combination of multiplicity and intensity of water-use is the key element conditioning the degree of interactions between stakeholders. These interactions are the mechanisms which impact, either positively or negatively, upon the communities' livelihoods. Potentially, multi-use conflicts can occur between any of the activities listed in Table 1.

Most of the water multi-use interactions taking place between stakeholders (especially at the intra-household or intra-community levels) are not, however, necessarily of conflictual nature. Yet, very often, those interactions are perceived, presented and analysed within the restricted framework of conflict (or conflict resolution) analysis (e.g. Nickum and Easter 1990, Charles 1992, Blench 1996).

Other categories of interactions are possible. Four are used in addition to conflict in a typology (Table 2) to illustrate the more complex nature of multi-use interactions. Those include (along with conflict) neutral multi-uses, compromises, complementary uses and collaborations.

The typology also makes the distinction between multi-*uses* and multi-*users*. Multi-*uses* interactions may be experienced by the same individual/household/user group, while multi-*users* interactions occur by definition between different user-groups. In both cases, the users can be affected positively or negatively by the interaction(s).

3.3.1 Conflict of usages

Conflicts of usages between fisheries-dependent communities and other water-users are widespread throughout the world and greatly affect coastal, estuarine or inland fisheries. However, as noted previously, inland fisheries, because they compete with a larger number of other types of usages, are likely to be very often at the epicentre of those multi-use conflicts. In this respect, fishing communities appear to be frequently amongst the "losers" of these conflicts, due to the low priority that this activity is usually given by national (or even local) planners but certainly also due to the general lack of political power and/or voice that characterize these communities.

One very frequent and many times reported scenario which illustrates this type of conflict of usages is that which opposes irrigation schemes and fisheries. It is widely admitted that the productivity and diversity of inland aquatic resources may be strongly affected by the development of water resources for irrigation.

An illustration of this is the situation experienced by the Mousgoum communities of the Yaéré floodplain along the Logone river in North Cameroon (Béné *et al.* 2003a). Here the local populations have developed a complex livelihood strategy where fishing plays an important role both in terms of food security and generation of income.

Table 2. Typology of multi-uses and multi-users interactions

Type of interactions	Multi-use interactions	Multi-users interactions
▪ Conflicts	Conflict of usages: situations of negative externalities: the use of unit(s) of water (as a resource itself or as the vector of the resource, e.g. fish) by one activity/sector is affecting other users.	Stakeholder conflicts: Situations of competitions for the access to, or oppositions of interests about water-uses between two (or more) stakeholder groups.
▪ Neutral multi-uses	Neutral multi-use: situation where one type of water use does not affect another type of use.	
▪ Compromises		Stakeholder compromise: Situations of trade-offs – a trade-off is the process of balancing conflicting objectives- between two (or more) stakeholder groups.
▪ Complementarities	Complementarity of uses: situation where the use of water in one sector/activity may have positive outcomes in other activities/sectors.	
▪ Collaborations (or consensus)		Stakeholder collaboration: Situations of active agreement – materialized through alliance, partnership or association- between two (or more) stakeholder groups.

In 1979, however, a national irrigated rice-growing project was constructed under the management of the state-controlled company SEMRY (Rice Culture Expansion and Modernization Authority). The objective of the project was to control flooding of the adjoining floodplain and to allow the culture of irrigated rice through the construction of 28 km of embankments, plus some 80 km of dykes along the Logone River. These irrigation schemes seriously modified the hydrological regime in the entire floodplain, leading to an acceleration of the degradation of the environment which had been initially caused by the 1970-80s Sahelian drought. In particular these modifications eliminated the flooding of some 59 000 ha of floodplain and seriously reduced another 150 000 ha which were important breeding and nursery areas for fishes. Using simple calculations, and taking into consideration the catch losses induced by the flood reduction, Neiland and Béné (2003) estimated that this irrigation scheme induced a direct lost of US$ 120 million (first sale value) for the local community over the 21 years during which the flooding pattern was significantly affected (1979-2000)[5].

3.3.2 Stakeholder conflicts

As for the conflicts of usages above, the number and type of *stakeholder conflicts* that can potentially break out between fishing communities and other stakeholders are almost endless. Those types of conflicts are likely to occur in inland and estuarine environments where the number of different stakeholders other than fishing communities involved in water uses is large (e.g. herders, farmers). But these stakeholder conflicts can also occur in coastal inshore waters, even if the groups or communities which share the resources are less numerous. One classical example is the conflicts of interest between fishing communities and tourism activities. In the Caribbean, where marine tourism is well developed, the different activities (scuba-diving, sailing, jet-skiing) undertaken by tourists, either individually or through operators may interfere with fishermen activities. On the Island of Providenciales in the Turks and Caicos archipelago (British West Indies), for example, demographic pressures from a rising number of tourists is now reported to impact heavily upon fishing activities (artisanal conch and lobster fisheries). Providenciales relies mainly upon the tourist industry for employment and income, and fishing is becoming much less important. As the tourist industry expands, so too does the pressure on the coastal zone as divers, swimmers, water skiers and jet skiers vie for space. The waters are zoned and several marine parks have been created around the island in areas which initially did not overlap too severely with fishing grounds. However, dive operators competing with each other and seeking for ever more unspoilt and quiet dive sites are now reported to be encroaching on fishing grounds outside the parks, creating conflict with the artisanal fishermen (Bennett *et al.* 2001).

3.3.3 Stakeholder compromise

Conflicts between fishing communities and other users of waters are not unavoidable, even in the case of apparent competition for the same resources. *Compromise* is another possible type of outcome. The example used here to illustrate this type of interaction is the arrangement which was found between the Levuka fishing communities of the Makogai Island (Fiji) and the local authorities (Fisheries Division) on the creation of a protected marine reserve. Generally, in the Pacific Islands, where at least some vestiges of traditional marine tenure systems persist (Ruddle 1993), fishing areas are finely subdivided between villages, clans or families, and it is relatively difficult for one or more of these units to give up their holdings. In the case reported by Adams (1998), the Levuka people "owned" fishing rights around a series of islands which were felt to be a good site for protection of giant clam re-seeding experiments carried out by the local government-run hatchery. The Fisheries Division proposal to create a protected area was not initially well received, due mainly to worries about the ultimate ownership and control of the area. After several rounds of negotiation, a final agreement was reached in 1990, and then renewed in 1992. The key issue is that the protected area was not defined in *de jure* legislation but maintained in practice by formal written agreement, ratified in the traditional way, between the Tui Levuka (the traditional local leader) and the Minister responsible for fisheries. The reserve area is not entirely banned to fishing, but fishing pressure is sporadic and minimal, and a complete fishing ban is imposed both for the giant clams and the turtle nesting area on the shore. Subsistence fishing is held in abeyance except for certain special occasions agreed in advance between parties. Adams (1998, p. 134) who evaluated the case concluded: "*Significantly, the fishing rights to*

---

[5] In 1993, IUCN started a rehabilitation project in the area. The main objective was the restoration of the flooding area to a level close to the pre-dam conditions. This was to be achieved by the opening of the dyke at two different locations in 2000.

the area have not been extinguished and it is this government-community compromise with limited objectives that has enabled the area to become probably Fiji's most effective marine conservation area" (emphasized by C. Béné).

3.3.4 Neutral multi-uses

Neutral interaction refers to situations where two or more water-dependent activities undertaken simultaneously do not seem to impact on each other directly. Examples of neutral multi-uses are relatively sparse in the literature, although they may be more frequent in reality. The reason for this relative overlook is the fact that, due to their apparent neutral impact, these types of interaction do not attract much attention: they are neither totally negative (conflicts) nor overall positive (complementarity or collaboration), and stay therefore outside the usual "success and failure" framework adopted by scholars and/or practitioners to analyse natural resource use(r)s interactions. The very few cases trying to describe neutral interactions are therefore quite valuable for the original information they offer.

The example presented below is even more enlightening because it addresses this issue in a case where highly conflicting interactions are usually expected to occur, namely between inland fisheries and irrigation (see the section "conflicts of usage" above). In rural areas of the developing world, irrigation is indeed recognized as the single most important intervention impacting fisheries (World Commission on Dams (WCD) 2000). Irrigation systems may abstract and deplete (through evapo-transpiration) a large proportion of the annual flow from tropical river basins, and reduce the overall availability and ecological connectivity of aquatic habitats. However, at the same time, it is (less frequently) recognized that rain-fed rice paddies designed to store water for extended periods, can create aquatic ecosystems with many similarities to natural floodplains. Like floodplain habitats, paddies are colonized by fish during the wet season and contribute substantially to the overall fisheries production of the river-floodplain system.

Recently, Nguyen Koa and her colleague conducted a series of quantitative surveys in the rice-based farming system of Southern Laos to evaluate the impacts of small- to medium-sized weir and dam irrigation schemes on local fisheries. They showed that dam schemes caused no significant overall decline in catches, but a very significant re-distribution of catches and effort into the newly created reservoirs. In both weir and dam schemes, changes in catch were largely explained by changes in fishing effort. No significant impacts on fish species richness were detected. The authors concluded: "*rather than being fundamentally degraded as often assumed, fish populations and the fisheries they support can remain productive and diverse within irrigated rice systems*" (Nguyen Koa *et al.* 2003).

3.3.5 Complementarities

Empirical analyses of potential *complementarities* between water multi-uses, and especially between fishing and other rural activities at the household level, are sadly missing. The main reason for this gap is that fishing has been considered exclusively from a mono-sectoral point of view for many decades, despite the fact that the multiactivity-based livelihoods of most fisher-farmers from river or floodplain environments in Africa or Asia has been recognized for a long time both by practitioners and academics (e.g. Monod 1928). As a consequence, very few empirical studies have been carried out with the explicit objective of trying to evaluate the exact contribution of each of those activities to the households' livelihood. Some noticeable exceptions in the African floodplain context are Neiland *et al.* 1994, and Béné *et al.* (2003a; 2003b); and Barr (2000) in Bangladesh. All these field studies were, to some extent, based on the main principle of the Sustainable Livelihood Approach[6]; in contrast with other studies, they were based on a trans-sectoral, holistic approach, using activity ranking and wealth ranking analyses.

Overall, the main conclusion of these analyses was that the contribution of fisheries to households' livelihood varies greatly depending on the household's wealth (or symmetrical poverty). No generalization across or even within communities is possible, and the widely accepted perception that

---

[6] Even if the study by Neiland *et al* (1994) was conducted years before the formal SLA framework was developed, these authors had already recognized the necessity to adopt a multi-sectoral approach.

"fishermen are the poorest of the poor" may be misleading in a large number of cases (see Béné, 2003) for a more in-depth discussion on this point.

From these studies, a whole set of issues were identified which need further investigation, especially in relation to the possible role of fisheries in poverty alleviation. In the African floodplain context the following key issues were highlighted:

Fisheries, poverty, and wealth stratification:

Access to fishing activity and/or fishing grounds is largely determined by a household's wealth level. However, at the same time, fishing activities contribute to a large extent to wealth differentiation. These two mechanisms tend to reinforce each other and suggest that fishing is not systematically a good "leverage" for poverty alleviation. This last point is in agreement with the results presented in Fig.2 (c) and (d).

Fisheries and livelihood diversification:

Fishing can contribute to a households' livelihood diversification through a wide variety of ways. This ranges from the "diversification for survival" strategy adopted ex-post by households in the case of temporary environmental and/or socio-economic crisis, to the "diversification for accumulation" strategy generally developed ex-ante by better-off households. The "diversification for survival" strategy is closely related but different from the "activity of last resort" which is generally assumed to characterize fisheries (see section 5 below on this point).

3.3.6 Collaboration (consensus)

The last type of multi-user interaction is *collaboration* (or *consensus*). Like conflict situations, consensus scenarii have received considerable attention, not necessarily because they are more common than other types of interactions, but rather because they are the success stories from which "good lessons and practices" can, in theory, be derived.

One particular example which illustrates these collaborative interactions between stakeholders involved in water multi-uses, is Community-Based Ecotourism Management (CBEM). Generally, CBEM projects are based on initiatives managed by the local communities relying on ecosystem goods and services to improve their socio-economic status. Successful CBEM case studies show that the main challenges are minimization of impacts, benefit sharing equity and integrated national policies for rural development. In a recent study, Foucat (2002) assessed the sustainability of the ECBM project of the village of Ventanilla, south Pacific coast of Mexico. The households of this poor rural community, which used to make their living from the exploitation of sea turtle, were heavily impacted by the turtle hunting ban imposed in 1992 by the federal government. The community was then forced to search for new sources of income. With the initial help of a local non-governmental organization (NGO), and then the collaboration of governmental organizations (including one University, the Ministry of Environment and the Marine Turtles Mexican Centre), the local community successfully developed a series of eco-tourism activities within an appropriate local institutional framework (creation of a cooperative to manage the benefits of the activities). The case study shows how such a type of collaboration ensured the economic and social viability of the project. The CBEM now generates the largest part of the income of the households belonging to the cooperative, which complete their revenues with subsistence agriculture and fishing.

3.4 Multi-uses of water: implication for research

From this general overview, a series of conclusions can be derived which highlight the need for further research.

- In developing countries, due to past (and still existing) over-emphasis on mono-sectoral approaches, analyses of water multi-uses and water multi-users' interactions are rare.
- The mechanisms which condition the outcome of interactions between different uses and different users of water remain obscure. As illustrated by the examples above, the interactions between fisheries and irrigation schemes may be detrimental (Yaéré case) or neutral (Southern Laos). Similarly, the interactions between fisheries and tourism activities may be conflictual (Turks and

Caicos Islands) or lead to collaborative initiatives (Ventanilla CBEM project). We are, however, far from reaching a complete understanding of the complexity and richness of interactions which bind fishing activities to the other water user activities at the household or community levels. A similar conclusion holds at the regional and national levels for water multi-uses and/or multi-users policies and planning. There is in these domains an urgent need for the development of adequate analytical frameworks to implement cross-sectoral analyses.

- Success or failure stories are only part of the overall picture. A large number of empirical situations do not fall into those two clear-cut "theoretical" categories, but are located somewhere along a spectrum of more complex and constantly evolving interactions. Figure 3 attempts to highlight this point. The figure illustrates in particular that, except for some studies on conflict resolution (compromise) carried out recently and mainly based on developed countries' experiences (e.g. Hart and Pitcher 1998) little research has been conducted so far to understand complementary interactions (both at the local household, community, and national levels) in the specific context of developing countries.
- Lessons can be drawn from water multi-uses and multi-users interactions. But to generate valuable conclusions, (a) the work would require a large-scale, rigorous research programme implemented on an international, multi-disciplinary, and more fundamentally multi-sectoral, basis – the worldwide collaborative Challenge Programme on Water and Food co-ordinated by the Consultative Group on International Agricultural Research (CGIAR) is a possible example of such collaborative set-up between different research institutions (CGIAR 2002); (b) these analyses should not simply focus "in a static manner" on the success or failure scenarios and on the factors which explain those successes or failures but rather analyse, in a more "dynamic" manner, the socio-institutional and economic factors (including policy impacts) which constrain or facilitate the move along the interaction spectrum.

4. THE ISSUE OF VALUATION AND INFORMATION USE IN FISHERY POLICY

4.1 General context: an urgent need for better valuation of fishing activities

The conclusion highlighting the poor understanding of the complexity of water multi-use and multi-user interactions also holds for the contribution of fishing activities to economic development and poverty alleviation. Very little has been done (especially in comparison to other rural activities, such as farming or forestry systems) in these domains. It is for instance widely admitted that in most parts of Africa and Latin America, and to a lesser extent in Asia, it is currently extremely difficult to make any accurate and up-to-date assessment of the economic value of small-scale fisheries activities (Neiland 2003, Cowx 2003). Similarly, a large number of recent work underlines the great potential of small-scale fishing activities for economic development (both at local and national levels) but systematically highlights how poorly the true (economic) value of this sector is reflected in official statistics and discussions on food security and livelihoods (e.g. European Commission 2000, Kaczynski and Looney 2000, Anon. 2001).

This knowledge gap and lack of proper valuation is usually presented as the main constraint for the design of appropriate fishery policy at both regional and national levels. Recently, in relation to research activities in the Mekong Basin, a DFID document emphasized:

"*…the failure to understand the value of the river in its 'natural' state, and of the variety of economic, ecological and livelihood benefits that rivers and floodplains can deliver, is seen as a weakness in major policy decisions related to large-scale basin development projects*" (DFID 2001).

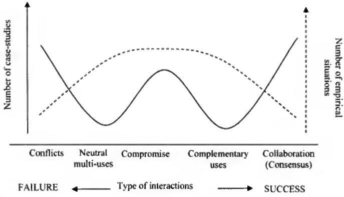


Figure 3. The current mismatch between research focus (solid line) and empirical situation (dashed line) in the domain of water multi-use situations.

Furthermore it can also be argued that an additional reason for explaining why policy related to river-use and conservation is weak is that the ecological "values", i.e. ecological ecosystems "services" provided by rivers is in general poorly understood. The term "value" does not therefore just relate to economic value but also to a wider understanding of the importance of fisheries in maintaining ecosystem services.

Faced with this lack of information, not only national policy-makers and planners, but also international development agencies, are severely constrained in their ability to formulate and implement rural development policies appropriate for, and adapted to, the sector.

This perception – which tends to explain the lack of appropriate policies and planning in small-scale fisheries by the poor abilities of practitioners and academics to properly evaluate the true ecological, social and economic values of small-scale fisheries, hides, however, another important dimension of the problem. Experience shows that the generation of (more) information on the economic and/or social values of small-scale fisheries is not a sufficient condition to support more appropriate agenda-setting and to ensure the implementation of successful policies. The impact of social/economic information generated through a better evaluation process is not merely determined by the quality of that information, but also to a large extent by the nature of the policy environment. In other terms, better (or more accurate) valuation is not necessarily the solution to the problem. One can indeed identify some special circumstances where the generation of more information would have no tangible effect on the well-being of (local) populations, unless the general policy context within which this information is "injected" is properly understood, and the alternative usages affecting the water resources genuinely evaluated[7].

These remarks highlight two distinct but complementary domains where further research activities need to be engaged.

- Valuation methods for fishing activities within a context of water multi-uses and multi-users, with special reference to local rural development and poverty alleviation in the specific context of developing countries.
- Policy research for a better understanding of small-scale fisheries policy process (design and implementation) in the specific context of water multi-uses and weak governance characterizing developing countries.

---

[7] For illustration, an in-depth assessment of the social and economic values of the inshore and deltaic fishing activities operated by the local populations of the Delta and Bayelsa states in Nigeria is unlikely to have any impact on the actual status quo, unless this information is placed within the wider context of the Nigerian national economic development priorities (and in particular, the oil-revenue issue).

The first of these two research areas will be treated in detail in the next section. The second research area is beyond the scope of the present paper and will not be developed here. It corresponds to the Theme No.3 of the TOR "Policy objective, legal framework, institution and governance" and should be addressed under this last theme.

4.2 Valuation of fishing activities within a multi-use, multi-user context

In general terms, values can be defined as: "beliefs, either individual or social, about what is important in *life and thus about the ends or objectives which should govern or shape public policies*" (Royal Commission on Environmental Pollution, 1998). Based on this definition, economic valuation in fisheries can be approached in a number of different and yet complementary ways. Three broad economic-value study approaches can be identified: (1) conventional economic valuation; (2) economic impact analysis; and (3) socio-economic analysis.

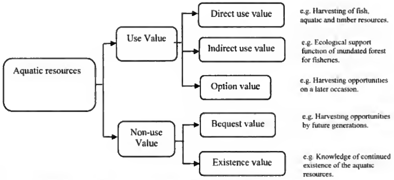

Aquatic resources
Use Value
Non-use Value
Direct use value
Indirect use value
Option value
Bequest value
Existence value
e.g. Harvesting of fish, aquatic and timber resources.
e.g. Ecological support function of inundated forest for fisheries.
e.g. Harvesting opportunities on a later occasion.
e.g. Harvesting opportunities by future generations.
e.g. Knowledge of continued existence of the aquatic resources.

Fig. 4. Components of the Total Economic Value (TEV) of an aquatic resource, such as a river system and its adjacent wetlands.

4.2.1 Conventional economic valuation

The conventional approach in economics to environmental valuation is to look for some way of measuring human preferences for or against changes in the state of the environment (improvement or deterioration). Where such preferences are expressed as willingness to pay – for example, to raise water quality on a certain stretch of river – value can be expressed in monetary terms. This can then provide a rational basis for policy decision-making on the use or management of environmental assets.

ECONOMIC VALUES AS SOCIAL VALUES

It can also be argued that economic values are social values, since the concept of value is anthropocentric (see definition above): it is the people who value the environment, and accordingly the estimated value resides with the individuals themselves rather than in the objects of their assessment. The arithmetic of conventional economic valuation is underpinned by Economic Efficiency Analysis (EEA) which has the maximization of social welfare (defined in terms of the optimal allocation of resources) as its goal. There are two ways in which EEA is commonly applied. These are cost-effective analysis and cost benefit analysis. With cost-effective analysis there is a presumption in favour of the least-cost option for achieving a given objective; with cost-benefit analysis, the presumption is in favour of the option which produces the highest ratio of monetary benefits to costs. In short, there is an implicit value judgement underlying efficiency analysis (i.e. that improvements in economic efficiency are desirable). In a policy-planning context, this presumption in favour of efficiency is the basis of a number of decision criteria that can be used to select and prioritize project options (or other interventions) in terms of their economic value to society.

TOTAL ECONOMIC VALUE

It is recognized that a natural resource may provide a range of benefits according to the particular use or function it fulfils, and this forms the basis of the concept of Total Economic Value (TEV). The components of TEV in respect of an aquatic resource, such as a river system and its adjacent floodplains, are shown in Figure 4. The obvious and tangible benefits would be those derived from *direct use* of the resource, and these may materialize in the form of commodities (e.g. fish, aquatic plants, fuel-wood) or services (e.g. recreation and amenity). The aquatic resource may however also have additional indirect use, such as coastal protection and providing a habitat for juvenile fish. These represent the ecological values of the ecosystem. Individuals may also derive a benefit from being able to postpone their personal use of the resource to a later date; they attach an option value to using the resource. There is also another set of benefits, which are quite distinct, termed *non-use* (or "passive" use value). This might include the value associated with the desire to maintain a river fishery intact for future descendents (bequest value) or simply the satisfaction of knowing that a particular aquatic habitat has been preserved in perpetuity (existence value).

4.3 Economic impact analysis

In contrast to the EEA described above, Economic Impact Analysis (EcIA) does not set out to determine whether a particular policy intervention or project is either beneficial or detrimental in terms of economic worth to society. While EcIA will consider the level of benefits generated by an intervention, it does not consider costs of implementation (i.e. there is no benefit-cost framework). Instead, EcIA aims to establish what effects a particular policy intervention or project has on specific variables. This might involve using *revenue analysis* to see whether a new fisheries management system is likely to raise fishermens' gross earnings or revenue. One direct application of this EcIA approach already mentioned is the evaluation of the revenue losses induced by the SEMRY irrigation schemes on the Yaéré populations (see section 3.3.1).

More ambitiously, EcIA might involve the application of *multiplier analysis* to measure the total economic activity generated by a new fisheries management system as a consequence of the interdependence between fishing and other sectors comprising the regional economy. The total economic impact will be made up of direct and secondary (i.e. indirect and induced) effects both locally and regionally. In the case of fisheries this will include not only the effects on employment and income that an improvement in the management system (or an increase in fish production or fleet size) can induce on direct upstream and downstream sectors such as boats and fishing gear supplies and services, processing, trading and marketing activities, fish transport, but also indirect effects such as the increase in demand for infrastructure and services (e.g. port infrastructures, education and health services, etc) which may follow the economic improvement of the area which benefits from the improved fishing activities.

4.4 Socio-economic analysis

Finally, it is important to reiterate the point made above, that conventional economic valuation is concerned with the analysis of whether particular interventions or projects improve the net wealth of society. It might be the case that this outcome also involves the creation of "winners" and "losers" in society. For example, the building of a dam across a river for hydro-electric power involves a wide diversity of effects including major changes in environmental quality and aquatic resource use. Conventional cost-benefit analysis sidesteps the issue by invoking the principle of "potential compensation" (i.e. that the intervention represents a net gain to society if the winners could compensate the losers and still be better off), but since this principle does not insist that compensation actually be paid it starts to become rather unsatisfactory where the losers also happen to be the poorest of the poor.

In other terms, the arithmetic of economic valuation may well adjudge a project such as dam construction, to be worth undertaking insofar as it improves the net wealth of society, but it is unclear whether the social impact of the project is likely to be neutral or not. In such situations (especially where there is poor governance within the weak state context) something more than economic valuation is warranted, specifically a *distributional analysis* to examine how the net costs and benefits are apportioned across different groups affected by the change. Socio-economic analyses can often provide an important starting point in identifying and characterizing the socio-economic strata in a community or region. Once the social strata are known, further in-depth economic studies (e.g. income-expenditure surveys) can provide a better understanding of benefit flows (or the lack of them) in relation to specific policy interventions.

4.5 Livelihood analysis

In recent years, socio-economic analysis has been further extended with the development of techniques for Livelihood Analysis (LA). When underpinned by conceptual frameworks, such as the Sustainable Livelihoods Approach (SLA), they can help to provide a better understanding of the relationship between human society and natural resources. In this respect, LA can be used to complement economic valuation and socio-economic analysis.

4.5.1 The rational for adopting Livelihood Analysis

Intrinsically, economic valuation techniques do not permit the identification of the factors which influence or affect people's access to these resources. However, very often the key issue is not the availability of the resource (or conversely its scarcity, to which its economic, or even social value is related), but the access to this resource. Extending Sen's main conclusion[8], which was initially framed in the specific context of famine (Sen, 1981), to the wider domain of natural resources, an increasing number of empirical studies have clearly demonstrated that poor people in rural areas are usually those who lack access to the natural resources: e.g. forest, fishing grounds, grassland, (e.g. Kremer 1994, Devereux 1996, Leach, Hearns and Sconnes, 1999).

Within the context of fisheries, this issue can be illustrated through the example of the Fisheries Enhancement Programmes (FEP) initiated in the 1990s in Bangladesh. These FEP were carried out with the double objective: of (*i*) mitigating fish resources over-exploitation; and (*ii*) poverty reduction for the poorest (landless) households which largely depend on these resources to sustain their livelihoods. For a majority of them, these FEPs have been technically successful and there is little discussion that fish production increases in the enhanced water-bodies (see for instance Welcomme and Bartley, 1998. Ali and Islam, 1998. Cowx, 1999). There is, however, increasing evidence that at the same time these FEPs have partially or even totally failed to improve the food security and welfare of the poorest people (Ahmad *et al.* 1998, Apu and Middendrop 1998). The literature reveals in particular that the poorest, who could not invest in adequate fishing gears and fishing licenses (required to access the newly enhanced water-bodies) were totally excluded or only benefited from a very limited portion of the increased fish production (Bernacsek, 1994. Capistrano, Ahmed and Hossain, 1994). This example is particularly instructive because it clearly illustrates the point emphasized above, i.e. determining the value of a resource may be irrelevant, if people cannot access it.

It can further be argued that adequate policies and processes (e.g. effective management) of natural resources needs information about the people involved, and the ways in which people use natural resources to sustain their livelihoods. In other words, to make an appropriate decision regarding the management of a natural resource, one not only needs the economic value (albeit through the most comprehensive evaluation framework possible, such as the TEV), one also needs to know the contribution which this resource makes to livelihoods: who uses the resources? When? How?

The Sustainable Livelihoods Approach (SLA) offers a useful framework to answer these different questions. In brief, SLA is a holistic and people-centred approach that attempts to capture and provide a means of understanding people's livelihoods, and in particular the factors and processes which affect these livelihoods (DFID 2000a). The framework consists of five components: (1) the vulnerability context of the environment in which the communities under consideration operate; (2) the livelihood assets of these communities; (3) the Policies, Institutions and Processes (PIPs) which affect their lives and in particular their access to livelihood assets; (4) the livelihood strategies which the communities adopt; and (5) the outcomes they achieve or which they aspire. An important aspect of the SLA is its use in helping to understand the role of institutions (e.g. rules or norms) which appear to be so important in shaping the mechanisms which affect people's access to the resource.

---

[8] Sen's main conclusion, based on the empirical observation that people can starve to death in the midst of food, is that it is the people's entitlement to the resource (in this case, food), rather the abundance of this resource, which is the key factor to explain famine.

SLA is therefore a powerful tool which can provide the conceptual basis for:

- the analysis of the causes of vulnerability – shocks and stresses in the economic, social and political context, trends, seasonality, fragility of natural resources, etc. – which affect the communities;
- the assessment of the assets, at the individual, household or community levels, comprising human, social, economic, physical and natural resource assets;
- the description of the context within which livelihoods evolve – policies at both micro- and macro-levels; civil, economic and cultural institutions, both formal and informal; the nature of governance and its processes at all levels in society;
- the identification of people's livelihood strategies, including, but not restricted to, consumption, production and exchange activities; and
- the evaluation of the resulting livelihood outcome, assesses multidimensionally in terms of food and other basic needs security, greater sustainability of the natural resource base, reduced vulnerability and increased income.

In summary the value of such a framework is to encourage analysts to take a broader and systematic view of the factors that affect people's livelihoods – whether these are shocks and adverse trends, poorly functioning institutions and policies, or a lack of assets – and to investigate the relations between them. It does not take a sectoral view, but tries to recognize the contribution made by all the sectors to building up the stocks of assets upon which people draw to sustain their livelihoods. It is important, however, to keep in mind that this SLA is, and remains, a *conceptual* framework. It is not an assessment technique *per se*.

4.5.2 Livelihood analysis in practice

As mentioned earlier, water is a multi-use/multi-user resource. This characteristic induces a certain number of important methodological constraints. In particular, the intricacy of activities characterizing the livelihood strategies of the large majority of fishing households – cf Fig.2 (c) – implies that mono-sectoral approaches disaggregating and considering these uses as separated activities (e.g. fisheries on one hand, and agriculture on the other) are not appropriate. To evaluate more correctly the exact contribution of these activities and their complementarities more integrated (holistic), assessment analyses are needed where the different sectors of the local economy would be viewed together as a joint production activity.

The survey techniques and methods required for those trans-sectoral socio-economic valuations already exist. They have been tested and applied for many years in other domains (e.g. agro-pastoral, agro-forestry systems) and their respective methodological and analytical strengths and weaknesses are well documented (e.g. DFID 1998). Usually a combination of participatory and non-participatory (passive) techniques is required. Those methods are either qualitative or quantitative in nature, based on verbal or visual, rapid or in-depth interviews/data collection. They can be developed as case studies or relying on larger-scale surveys. They are usually designed and implemented by multidisciplinary teams. There is no one unique 'recipe' or best methodological combination. The only central condition is that they must be trans-sectoral and holistic. Some of them are presented in Table 3 below but the list is not exhaustive.

Finally, to sum up this discussion, the different techniques and approaches which have been briefly described in this section are recalled in Figure 5. Altogether, these different, but complementary approaches constitute an overall framework which can be applied for the valuation to fisheries and aquatic resources within a multi-use/multi-user context.

Table 3. Types of socio-economic techniques susceptible to be used in fishery-livelihood analysis.

Type of analysis / assessment	Data collection techniques
Wealth ranking	
Income-expenditure survey	
Food Security assessment	
Institutional analysis	
Stakeholder analysis	Participatory/Consultative/Passive
Conflicts analysis	Verbal/Visual / Analytic
Ethnic analysis	Quantitative/Semi-Quantitative/Qualitative
Gender analysis	Rapid Appraisal/In-depth survey
Natural Resource accessibility analysis	Case study/Large-scale survey
Multi-sectoral Activity Analysis	
Household survey	
Activity ranking	
Seasonal Calendar	
Oral histories	

5. FISHERIES AS "A LAST RESORT ACTIVITY" FOR THE POOREST

The last section of this paper addresses the particular issue of "fishery as a last resort activity" for the poor. Basically the idea conveyed by this hypothesis is that fisheries, due to their open or semi-open nature, offer an alternative activity to people (individuals, or communities) when other economic activities fail to provide adequate economic support, or when these people are economically or institutionally denied the access to other activities. Through this mechanism, fisheries are assumed to offer "pro-poor" socio-economic support to the most deprived (e.g. the landless).

The objective of the section is not to provide any definite answer to whether or not fishery does fulfil this role of "activity of last resort", but simply to highlight the complexity of the issue and to offer some preliminary elements of reflection for further investigation. It should also be noted that the question is addressed here mainly from a theoretical/conceptual point of view, although reference to empirical evidence is made in the first part of the section.

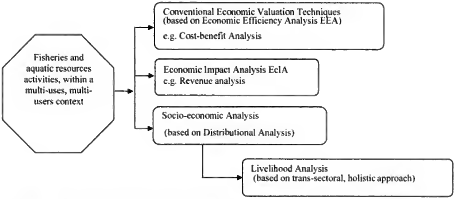

Fisheries and aquatic resources activities, within a multi-uses, multi-users context
Conventional Economic Valuation Techniques (based on Economic Efficiency Analysis EEA)
e.g. Cost-benefit Analysis
Economic Impact Analysis EcIA
e.g. Revenue analysis
Socio-economic Analysis
(based on Distributional Analysis)
Livelihood Analysis
(based on trans-sectoral, holistic approach)

Figure 5. Valuation techniques for aquatic resources within a multi-use context.

5.1 A wide consensus across the literature

The first point to notice is that the "last resort activity" hypothesis has received a large consensus in the fishery literature. Table 4 is a collation of quotes from articles and documents which explicitly report the occurrence of this mechanism in small-scale fisheries. The table illustrates the great extent to which this role has been emphasized, especially in developing countries over the last two decades.

Table 4. Fisheries as the "last resort for the poorest"*

Reference (chronological order)	Quotation
Panayotou 1980, p.145	"Open access fisheries (as well as other natural resources of similar status) often serve as safety valves for population pressures and as source of subsistence and cash income for those who by virtue of their poverty have little or no access to other sources of income"
Panayotou 1982, p.30 (see also footnote 32 p.27)	"There is considerable evidence that coastal fishing is an economic activity of last resort. For example Pollnac & Sutinen (1979) report that in East Africa "fishing is viewed as the employment of last resort … people fish when farming is not feasible"… Yet another example is found in Cordell (1973) who reports that in Northeast Brazil labourers released from coconut plantations took up canoe fishing for lack of better alternatives…"
Bailey & Jentoft, 1990, p.337 and p.341	"The open access nature of fishery resources and the ease with which people can enter a fishery with limited experience or capital investment, means that there are few obstacle to seeking a livelihood at sea…. The role of fisheries as employment source of last resort underscores the importance of employment generation…" "… ocean fisheries function as a society valve for surplus labour …"
FAO 1994, p.7	"Marine fisheries typically are the employer of last resort. Fishers who do not own the boats on which they work are reported to feel a general sense of hopeleness and despair regarding opportunities for upward mobility".
Machena & Kwaramba 1997, p.245	"The worsening economic climate in the country is also a strong contributory factor to the crisis. Fishing is often described as an 'activity of the last resort'. Entry into the gillnet fishery is easy compared to other economic ventures because of the low capital input requirements".
Townsley 1998, p.142	"Indeed, aquatic resources in many parts of the world constitute a resource of 'last resort'. Open access fisheries and other forms of aquatic resource use are fall-back options for the rural poor when loss of land or failure in access to other rural activities threaten their livelihoods".
Paynes 2000, p.1	"[Fishery] is often one of the few livelihoods open to the landness and often becomes the default livelihood".
FAO 2000, point 5	"Small scale and subsistence fisheries have often been denoted as 'employers of the last resort' implying that people enter open access fisheries when they are unable to make a living in other sectors".

** In this table only references are quoted which use explicitly the terms "last resort" or "safety valve", not those which mention or describe this mechanism but do not use the two key-terms (for those, see for instance van Zalinge, Thuok and Seang Tana (1998) or Degen and Thuok (1998) for the rural populations in Cambodian floodplains after Pol Pot times, Beck and Gosh (2000) for the populations living on the Bank of the river Matla (India), Gutkind (1989) for the Fante (Ghana) and Jul-Larsen (1994 for the Xwala (Benin) for population during the development of the West-African coastal fisheries in the 1950s and 1960s, Dia (1998) for the cephalopod fisheries in Mauritania in the 1990s, etc. (source Béné, 2003)*

5.2 A combination of two different mechanisms

A more in-depth analysis, however, highlights that this pro-poor capacity of small-scale fisheries to sustain poor people results in fact from the combination of two distinct mechanisms:

- First, the "redistributive" dimension of fisheries, i.e. the fact that fishing activities often appear to be of greater importance to the poor in terms of income, food security and employment than for the non-poor. Within this approach, fishing is considered as a fundamental "pillar" on which poor families facing chronic (long-term) destitution rely to sustain their livelihoods.
- Second, the "safety-net" capacity of fisheries, the fact that in periods of individual or collective economic crisis, fishing may also provide alternative or additional sources of income, employment and food for the households – poor and less-poor – whose livelihoods have been temporarily reduced or affected by the crisis.

Those two mechanisms (Table 5) are detailed in the following paragraphs.

5.2.1 The "redistributive" dimension

The assumption of redistributive capacity is based on the empirical observation that fishing activities usually make up a larger share of the poor people's subsistence and income bases than for the better-off households. This heavier reliance on fisheries activities by the poor can, itself, be explained by the combination of two mechanisms.

(A) A *compensating effect* offered by the semi-open or communal access which usually characterizes fishery resources. In situations of (economically or institutionally) restricted access to other capital (e.g. financial capital, such as credit) or production factors (such as, private land) the supposedly relatively easy/free access to fishing grounds allows the poor to rely more heavily on the local common resources to obtain/extract the goods and services they need to sustain their livelihoods.

Although the compensating effect is observed in a significant number of situations, its occurrence depends on a stringent condition that Leach and Mearns (1991, p.10) termed the "environmental entitlements", i.e. the "*combined outcome of: (a) the level/quantity of environmental resource bundles that people have command over as a result of their ownership, their own production, or their membership of a particular social or economic group; and (b) their ability to make effective use of those resource bundles*". Evidence suggests that the fulfilment of these two conditions is far from being systematic for the poorest part of rural communities – as will be emphasised below – and some scholars even argue that the effective occurrence of the environmental entitlement hypothesis for the poor is in fact an exception rather than the general rule (e.g. Devereux 1996).

(B) An *income share effect*: Other things being equal, the relatively lower total incomes of the poor makes it mathematically easier for fishery-related activities to represent a greater share of their total earnings[9]. It is therefore unsurprising that for a majority of rural poor families, fishing-related activities do represent a large part of their incomes.

Combined, these two mechanisms (the compensating effect and the high share in poor households' income) explain why rural poor may appear to depend more heavily on fishery-derived activities than better-off households. Based on this, the fishery sector is therefore very often perceived and presented as a fundamental element of rural economy upon which poor people facing chronic (long-term) destitution can rely to sustain their livelihood. For several decades, a large number of national governments or bi-lateral or international donor agency poverty-reduction programmes have been based on this perception (e.g. DFID 2000b). It should (or could) then be raised the question: to what extent the relative failure of some of these programmes is related to this initial hypothesis?

---

[9] For illustration, let us assume two households (a poor and a non-poor) who derive the same amount (e.g. US$2 per day) from fishing activities. If the daily total income of the first household is US$4 p.d. while the revenue of the second is US$10 p.d., this means that fishing corresponds respectively to 50 and 20 per cent of the households' total daily revenues.

5.2.2 The safety-net dimension

The second element that contributes to this perception of "fishery as a last resort employer for the poorest" is that fishery also appears to play a fundamental role as a "safety-net" element for people in case of contingency. This is the replacement effect. When rural or urban household-head looses his/her wage-based job, when farm crops fail, or when the entire local – or even national – economy collapses, the fishery sector very often represents additional or alternative sources of income, food and/or employment which can help the household to reduce the impact of the crisis. For instance Machena and Kwaramba (1997) reported how the fishery of the Lake Kariba played this role of safety-net during the mid-1990s.

"*... The worsening economic climate in the country is also a strong contributory factor to* [this]... *People who are threatened by poverty easily find their way into fishing. Economic development opportunities in the areas around Lake Kariba are limited. People are basically agrarian despite the fact that agriculture frequently fails because of a hot and dry climate. During particularly dry years, the situation gets desperate, driving people into the fisheries. ... Fishing is often described as an 'activity of the last resort'. Entry into the gillnet fishery is easy compared to other economic ventures because of the low capital input requirements*" (p.245-46)

Civil or military wars, population displacements or natural disasters are also events which may drive entire populations to (re)turn to common property resources (and in particular fisheries) to palliate the loss of their regular source of livelihoods.

Table 5 summarizes the different points highlighted in the analysis. It shows how the two mechanisms which the hypothesis of fishery as a last resort activity relies on, act upon diverse dimensions of poverty – the redistributive dimension acting as a positive counterbalance against chronic (long-term) poverty while the safety-net capacity is used by the poor as a 'cushion' against short-term vulnerability.

Table 5: Mechanisms contributing towards the perception of fishery as a critical livelihood support (activity of last resort) for poor and / or vulnerable households.

Criteria **Pro-poor mechanisms**	(i) **Effects**	(ii) **Assumption**	(iii) **Poverty reduction effect / contribution to livelihood**	(iv) **Poverty dimension / beneficiaries**
Redistributive dimension of fisheries: the contribution of fishery for poor livelihoods appears higher than for non-poor.	*Compensating effect*: while denied access to other capitals and production factors, the poor rely more heavily on fishery-related activities to sustain their livelihoods. *Income share effect* *: the lower total income of the poor makes it easier for fishery-derived revenues to make up a high share of the total income.	*Environmental entitlements* of the poor i.e. · availability of the resource bundles that people have command over (as a result of their ownership, their own production, or their membership of a particular social or economic group). · ability of these households to make effective use of those resource bundles. No assumption	Fisheries providing Subsistence products and material (food, water, fodder, etc.). Income (through employment, self-employment, trade/commerce activities).	*Ex-ante strategy against long-term (chronic) poverty* Usually households unable to maintain a minimum living standard with the resource at their disposal.
Safety-net capacity of fisheries: fishery provides alternative and/or additional source of support in case of crisis.	*Replacement effect*: In situation of temporary crisis (collapse or cutback of the regular livelihood support), fisheries can provide activities and materials to replace or complement the deficient support. **	*Environmental entitlements* of the vulnerable households: points (a) and (b) as above.	Fisheries providing Mainly subsistence products and material (food, water, fodder, etc.). Possibly complementary income (through temporary self-employed activity, pretty trading).	*Ex-post reaction against transient poverty / Short-term vulnerability* Vulnerable households may or may not be above the "poverty line" initially but face risks to their livelihoods which could drop them below the line.

Notes: * The income share effect does not effectively participate as such to poverty reduction. It actively contributes to the perceived "redistributive" dimension of fisheries –see text for details.

** If the fishing sector becomes a permanent source of subsistence products or income, the safetynet role has been transformed into a chronic redistributive mechanism.

The table also shows that these two mechanisms are based on distinguishable effects which operate under different circumstances and affect different types of households. These effects may, however, complement and reinforce each other, generating this overall and confusing impression of pro-poor activity. Underpinning this perception is the assumption of "environmental entitlement", namely that fisheries are easily accessed by the poor.

5.3 A need for further research

Although this mechanism of activity of last resort may occur in a large number of circumstances in both inland and marine fisheries (as suggested by the list in Table 4), an increasing number of empirical studies question this assumption and emphasize that fishing can also, in other circumstances, be a powerful means of wealth differentiation and further marginalization of the poor. In the Chari Delta in Chad for instance, a recent fishery livelihood analysis showed that fishing contributes the largest proportion of income to the richest households and remains relatively inaccessible to the poorest. Those poorest households who lack fishing gears and have access only to marginal and low-productive water-bodies, must find alternative activities as their main source of income, and in this case, the study reveals that the households mainly rely on woodcutting. In these areas, it seems therefore that woodcutting plays the role of last resort for the poorest, while in contrast fishing activities are a key-element of the livelihoods of the richest households (Béné *et al.* 2003b).

This situation where the poorest seem to be excluded from the fisheries has been already described in other parts of Africa. In the Nguru-Gashua wetland in North Nigeria, Neiland *et ol.* (1997, p.300) observed for instance that *"the richest fishers ore those with ownership and access rights, whereas the poorest fishers are marginalized or excluded entirely from the most productive fisheries"*. In Bangladesh, which is a typical example of developing country where fisheries are usually presented as a fundamental safety valve sector for the poorest and landless, Kremer (1994) found that in some areas it was the poorest people who were denied access to the floodplain areas supporting the most productive fisheries. He concluded:

"Access to the fishery is effectively an asset. Being both scarce and unequally distributed it confers economic benefits upon fishermen, but to some more than others. ... In brief one should reconsider the popular romantic view that the floodploin is "an open access resource, open to anyone with a net" *(Majumder ond Durante 1993, p.1) and therefore a resource of last resort for the poorest of the poor. The most productive parts of the floodploin are gradually being privatized ond territoriol control over the rest has been established according to o community's relotive power*" (Kremer 1994, p.9).

In summary, it seems that the question of whether or not fisheries do act as an "activity of last resort" for the poorest may not be clear-cut and deserves further investigation. From the analysis above, it also appears that both theoretical (conceptual) and empirical works are required in this domain if we wish to address this issue in a more comprehensive way, and provide relevant policy recommendations for poverty alleviation in fisheries. At the present time, too much confusion between the different elements that contribute to this mechanism prevents a correct evaluation. The design of an analytical framework is first required that should help decompose and analyse the different mechanisms at work and their potential roles in poverty alleviation. Once it is conceptualized, this framework could then be applied to empirical case-studies through a large-scale research programme. The following list of questions provides some preliminary guideline for further research:

- Small-scale fisheries and poverty-reduction
    - Do small-scale fisheries have a real poverty reduction capacity? In other terms, do fisheries have an intra-sectoral capacity to reduce poverty?
    - If so, under which conditions? For whom?
    - How can this poverty-alleviation capacity be promoted without affecting the financial accumulation capacity of the sector (necessary for rural development). In other terms, is there a trade-off to be found between economic growth and redistribution within the fishery sector?

- Poverty reduction mechanisms
    - What are the exact roles and respective importance of the different mechanisms identified in Table 5 (redistributive effects, safetynet effect)?
    - Under which socio-institutional conditions do these different mechanisms operate effectively?
    - Are all those mechanisms equally desirable?
- Policy implications
    - Should the role of "activity of last resort" of the artisanal fisheries be supported?
    - If so, by which policies?
    - Is there an opposition between poverty reduction (through the "activity of last resort" ability of fisheries) and natural resource conservation?
    - If not, can those two agendas be satisfied simultaneously in the short-run in order to satisfy the Millennium Development Goals?[10]

---

[10] The Goal No.1 of the Millennium Development document (voted by the General Assembly of the United Nations in 2000) is "Poverty and hunger eradication" through Target No.1 = reduce by half the number of people living below the poverty line of USD1 per day, and Target No.2 = reduce by half the number of people suffering from hunger by 2015. The Goal No.7 and in particular its target No.9 is to integrate the principle of sustainable development in country policies and reverse the loss of environmental resources.

REFERENCES

Adams, T. 1998. The interface between traditional and modern methods of fishery management in the Pacific Islands. *Ocean and Coastal Management* 40, 127-142.

Adams, W. 1993. Indigenous use of wetlands and sustainable development in West Africa. *The Geographical Journal* 2, 209-218.

Ahmad, I., Bland, S., Price, C. & Kershaw, R. (1998). Open water stocking in Bangladesh: experiences from the third fisheries project. In Petr T. (Ed.), *Inland fishery enhancements*. FAO Fisheries Technical Paper 374, (pp.337-350). Rome: Food and Agriculture Organization and UK Department for International Development.

Ahmed, M., Navy H., Vuthy L., & Tiongco M. (1998). Socio-economic assessment of freshwater capture fisheries in Cambodia. Department of Fisheries, DANIDA, And MRC, Phnom Penh, Cambodia, Mekong River Commission, 185.

Ali, L. & Islam, M. (1998). An assessment of the economic benefit from stocking seasonal floodplains in Bangladesh. In Petr T. (Ed.), *Inland fishery enhancements*. FAO Fisheries Technical Paper 374, (pp.289-308). Rome: Food and Agriculture Organization and UK Department for International Development.

Anon. (2001). Report of the Seminar "contribution of fisheries to poverty reduction in West Africa" 14-15 February 2001, Dakar.

Apu, N. & Middendrop, H. (1998) Establishing fishers groups for self-management of enhanced fisheries in semi-closed waterbodies in Western Bangladesh (the experience of the Oxbow Lakes small scale fishermen project). In Petr T. (Ed.), *Inland fishery enhancements*. FAO Fisheries Technical Paper 374, (pp.393-406). Rome: Food and Agriculture Organization and UK Department for International Development.

Bailey, C. & Jentoft, S. (1990) Hard choices in fisheries development. *Marine Policy* July, 333-344.

Barr, J. (2000) Livelihood strategies and resource use in Bangladesh floodplain –opportunities for benefiting the poor where competing uses of resources occur. Invited presentation at DFID workshop: Improving the poverty focus of NRSP's research on management of natural resources. International Centre for Agricultural Research, Rothamsted, 29-30 November 2000.

Beck, T. & Ghost, M. (2000) Common property resources and the poor. Findings from West Bengal. *Economic and Political Weekly* 35(3), 147-153.

Béné, C. (2003) When fishery rhymes with poverty, a first step beyond the old paradigm on poverty in small-scale fisheries. *World Development* 31(6) forthcoming.

Béné, C., Mindjimba, K., Belal, E., Jolley, T. & A. Neiland (2003A) Inland fisheries, tenure systems and livelihood diversification in Africa: the case of the Yaéré floodplains in Cameroon. *African Studies* 62(2) forthcoming.

Béné, C., Neiland, A., Jolley, T., Ovie S., Sule O., Ladu B., Mindjimba K., Belal E., Tiotsop F., Baba M., Dara L., Zakara A., & Quensière J. 2003b. Inland fisheries, poverty and rural livelihoods in the Lake Chad Basin. *Journal of Asian and African Studies* 38(1) forthcoming (also available in Neiland and Béné (2002), pp.153-187).

Bennett, E., Neiland, A., Anang, E., Bannerman, P., Rahman, A., Huq, S., Bhuiya, S., Day, M., Fulford-Gardiner, M. & Clerveaux, W. 2001. Towards a better understanding of conflict management in tropical fisheries: evidence from Ghana, Bangladesh and the Caribbean. *Marine Policy* 25, 365-376.

Bernacsek, G.M. 1994. Socioeconomic constraints impeding implementation of the new fisheries management policy in Bangladesh. *Socio-economic Issues in Coastal Fisheries Management, Proceedings of the IPFC Symposium held in conjunction with the 24th Session of IPFC.* (pp.248-258). INDO-Pacific Fisheries Commission. Bangkok, Thailand 23-26 November 1993.

Blench, R. 1996. Aspects of resource conflict in semi-arid Africa. *Natural Resources Perspectives* 15, London, Overseas Development Institute.

Capistrano, A, Ahmed, M., & Hossain, M. 1994. Ecological, economic and common property issues in Bangladesh's open water and floodplain fisheries. *Third Biennial Meeting of the International Society for Ecological Economics.* San Jose, Costa Rica, 24-28 October 1994.

Chaboud, C., & Dème M. 1989. Ressources instables et pêche semi-industrielle: les exemples sénégalais et ivoirien. In Cury P. and Roy C. (editors) Pêcheries ouest-africaines ; variabilité, instabilité, et changement. Paris, ORSTOM, 489-503.

Charles, A. 1992. Fishery conflicts, a unified framework. *Marine Policy* Septembre, 379-393.

Chauveau, J.-P., Jul-Larsen, E. & Chaboud, C. (editors). 2000. *Les pêches piroguières en Afrique de L'Ouest; pouvoirs, mobilités, marchés.* Paris: Editions Karthala, IRD, CMI.

CGIAR. 2002. The Challenge Programme on Water and Food. Available at http://www.cgiar.org/

Cowx, I. 1999. An appraisal of stocking strategies in the light of developing country constraints. *Fisheries Management and Ecology* 6, 21-34.

Cowx, I. 2003. Value of fisheries river. Proceedings of the Second International Large River Symposium. Mekong River Commission and Food and Agriculture Organization, 11-14 February 2003, Phnom Penh Cambodia.

Degen, P. & Thuok, N. 1998. Inland fishery management in Cambodia: is the fishing lot system the basis for improved management or should it be abolished? *Crossing boundaries, 7th annual conference of the International Association for the Study of Common Property.* IASCP. Vancouver.

Devereux, S. 1996. *Fuzzy Entitlements and common property resources: struggles over rights to communal land in Namibia.* IDS Working paper 44, Brighton: Institute of Development Studies, University of Sussex.

DFID. 1998. Socio-economic methodologies. Best practice guidelines. Department for International Development London, published by the Natural Resources Institute.

DFID. 2000a. Sustainable Livelihoods Guidance Sheets, available at www.livelihoods.org

DFID. 2000b. Pathways out of poverty: people-centred solutions from fisheries research. Department for International development, Rural Livelihood department Renewable Natural Resources Research Strategy, London, available at :www.dfid.gov.uk.

DFID. 2001. People, Fisheries and Aquatic Resources of the Mekong A Research Programme Development Workshop, DFID-STREAM, 12-14 December 2001 Phnom Penh.

Dia, M.C. 1998. Mauritanie, volet socio-anthropologie. *Etude comparative des systèmes de gestion et de marchés dans les pêches céphalopodières d'Afrique de l'Ouest.* Projet de recherche DGXII-MUYS .

European Commission. 2000. Communication from the Commission to the Council and the European Parliament. Fisheries and Poverty Reduction. COM(2000) 724 final. Commission of the European Communities, Brussels, 20 p.

Evans, P. 2003. Community fisheries development on the Tonle Sap Great Lake. Proceedings of the Second International Symposium on the management of large rivers for fisheries. Mekong River Commission, Phnom Penh 11-14 February.

FAO. 1984. World Conference on fisheries management and development. Food and Agriculture Organization, Rome 27 June - 6 July.

FAO. 1994. Socio-economic Issues in Coastal Fisheries Management. Proceedings of the IPFC Symposium, Bangkok, Thailand 23-26 November 1993: Food and Agriculture Organization.

FAO. 2000. Poverty in coastal fishing communities. Advisory Committee on Fishery Research Third Session 5-8 December 2000. Rome: Food and Agriculture Organization. http://www.fao.org/DOCREP/MEETING/003X8905E.html.

FAO. 2003. Number of fishers doubled since 1970, Food and Agricultural Organization, Fisheries Department, available at http://www.fao.org/fi/highligh/fisher/c929.asp

Fay, C. 1994. Organisation sociale et culturelle de la production de pêche: morphologie et grandes mutations. In Quensière J. (editor) *La pêche dans le Delta Central du Niger.* Paris: ORSTOM, 191-207.

Foucat, A. 2002. Community-based ecotourism management moving toward sustainability, in Ventanilla, Oaxaca, Mexico. *Ocean and Coastal Management* 45, 511-529.

Gutkind, P.C. 1989. The Canoemen of the Gold Coast. *Cahiers d'Etudes Africaines* 29, 339-376.

Harrtmann, W. 1989. Conflictos de pesca em agua interiores da Amazonia e tentativas para sua soluçao. In Pesca Artesanal: tradiçao e modernidade. Encontro de Ciencias Sociais e o Mar. Progamma de pesquisa e conservaçao de areas umidas no Brasil, Sao Paulo, 103-118.

Hart, P.J.B. & Pitcher, T.J. 1998. Conflict, consent and cooperation: an evolutionary perspective on individual human behaviour in fisheries management. In: *Reinventing Fisheries Management* (eds. T.J. Pitcher, P.J.B. Hart and D. Pauly). Chapman & Hall, London, pp. 215-225.

Hoggarth, D. D., Cowan, V. J., Halls, A. S., Aeron-Thomas, M., McGregor, J. A., Garaway, C. A., Payne, A.I. & Welcome, R. L. 1999. Management guidelines for Asian floodplain river fisheries: 384, Rome: FAO, DFID, and MRAG.

Horemans, B.W., & Jallow, A.M., (editors). 1997. Report of the Workshop on Gender Roles and Issues in Artisanal Fisheries in West Africa, Lomé, Togo, 11 – 13 December 1996. Cotonou, Benin, Programme for the Integrated Development of Artisanal Fisheries in West Africa. 47p., IDAF/WP/97.

Jul-Larsen, E. 1994. *Migrant fishermen in Congo; tradition and modernity.* Bergen: Chr. Michelsen Institute.

Kaczynski, V.M. & Looney, S. W. 2000. Coastal Resources as an engine of economic Growth and reduction of poverty in West Africa: Policy considerations. *Coastal Management* 28, 235-248.

Kassibo, B. 2000. Pêche continentale et migration: contrôle politique et contrôle social des migrations de pêche dans le Delta central du Niger (Mali). In Chauveau J.-P., Jul-Larsen E. & Chaboud C. Eds., *Les pêches piroguières en Afrique de L'Ouest: pouvoirs, mobilités, marchés.* (pp.231-246). Paris: Editions Karthal, IRD, CMI.

Kremer, A. 1994. Equity in the fishery: a floodplain in N.E. Bangladesh. R94E, Bath, UK: Centre for Development Studies, University of Bath.

Lawson, R. 1977. New direction in developing small-scale fisheries. *Marine Policy* 1(1), 45-51.

Lawson, R. & Robinson, M. 1983. Artisanal fisheries in West Africa; problems of management implementation. *Marine Policy* (October), 279-290.

Leach, M., & Mearns, R. 1991. Poverty and environment in developing countries: an overview study. Report to ESRC, global Environment Change Programme and Overseas Development Administration, ESRC Swindon.

Leach, M., Mearns, R. & Sconnes, I. 1999. Environmental entitlements: dynamics and institutions in community-based natural resource management. *World Development* 27(2), 225-247.

Machena, C. and Kwaramba, R. 1997. The creation of property rights to promote sustainable development in the Lake Kariba inshore fishery in Zimbabwe. In Remane K. (ed.), *African inland fisheries, aquaculture and the environment.* (pp.245-254) Fishing New Books.

MRAG. 2001. The sustainable Livelihoods approach and capture fisheries: a strategic review of the Fisheries Management Science Programme. London: MRAG.

Monod, T. 1928. L'industrie des Pêches au Cameroun (Première partie: généralités). Paris: Société d'éditions géographiques maritimes et coloniales (SEGMC).

Neiland, A. (editor). 2003. Valuation of tropical river fisheries: A Global Review including Asia, Southern Africa, West and Central Africa, and Latin America. Report for the World Fish Center, Penang, Malaysia.

Neiland, A., Sarch, M.-T., Madakan, J., Ladu, B. M., Jaffry, S. & Cunningham, S. 1994. A socio-economic analysis of artisanal fisheries in N.E. Nigeria. CEMARE Report No.26, DFID Research Project R5471, Portsmouth: CEMARE, University of Portsmouth.

Neiland, A.E., Jaffry S., & Kudaisi K. 1997. Fishing income, poverty and fisheries management in North-East Nigeria. In Neiland A. (editor). Traditional management of artisanal fisheries in North East Nigeria CEMARE report No. R43 Final Report DFID Research project R5471 University of Portsmouth, 291-319.

Neiland, A. & C. Béné (eds.). 2002 Sustainable Development of African Continental Fisheries: A Regional Study of Policy Options and Policy Formation Mechanisms for the Lake Chad Basin. University of Portsmouth and European Commission, EU-INCO Project. Final Report, 286 p.

Neiland, A. & Béné C. 2003. Review of River Fisheries Valuation in West and Central Africa. Background paper commissioned by the World Fish Center for the Water, Ecosystems and Fisheries Review Workshop, Phnom Penh, 15-17 February 2003, 27p.

Nguinguiri, J.C. 2000. La pêche des migrants: un modèle de croissance pour la pêche locale? A propos du dualisme des théories du développement. In Chauveau J.-P., Jul-Larsen E. and Chaboud C. (editors) *Les pêches piroguières en Afrique de L'Ouest: pouvoirs, mobilités, marchés.* Paris: Editions Karthala and Institut de Recherche et de Développement, 281-297.

Nguyen Koa, S., Lorenzen K., Garaway C., & Chamsingh B. 2003. Impact of irrigation development on capture fisheries in the rice-based farming systems of Southern Laos. Proceedings of the Second International Large River Symposium. Mekong River Commission and Food and Agriculture Organization, 11-14 February 2003, Phnom Penh Cambodia.

Nickum, J. & Easter K. 1990. Institutional arrangements for managing water conflicts in lake basins. Natural Resources Forum, 14(3), 210-221.

Panayotou, T. 1980. Economic conditions and prospects of small-scale fishermen in Thailand. *Marine Policy* 4(2), 142-146.

Panayotou, T. 1982. Management concept for small-scale fisheries: economic and social aspects. FAO Fish. Tech. Pap. 228, Rome: Food and Agricultural Organization.

Panayotou, T. (editor). 1985. *Small-scale fisheries in Asia, Socio-economic analysis and policy.* Ottawa: International Development Research Center.

Payne, I. 2000. The changing role of fisheries in development policy. Natural Resource Perspectives No.59: Department for International Development, London.

Ruddle, K. 1993. External forces and change in traditional community-based fishery management systems in the Asia-Pacific Region. *Maritime Anthropological Studies* 6(1-2), 1-37.

Sana, B. 2000. Systèmes d'aménagement traditionnels des pêches et leur impact dans le cadre de la lutte contre la pauvreté sur les petites pêcheries lacustres du sud-ouest du Burkina Faso. In Report of the Seminar on livelihoods and inland fisheries management in the Sahelian zone, Ouagadougou, Burkina Faso, 03-05 July 2000, 115-128.

Sen, A. 1981. *Poverty and famines: an essay on entitlement and deprivation*. Oxford: Clarendon Press.

Smith, I. 1979. A research framework for traditional fisheries. 2, ICLARM Studies and Reviews, Manila: International Center for Living Aquatic Resources Management.

Thomas, D. & Adams, W. (1999) Adapting to dams: agrarian change downstream of the Tiga dam, Northern Nigeria. *World Development* 27(6):919-935.

Thompson, P.M. & Hossain, M. 1998. Social and distributional issues in open water fisheries management in Bangladesh. In Petr T. (Ed.), *Inland fishery enhancements.* FAO Fisheries Technical Paper 374, (pp.351-370) Food and Agriculture Organization and UK Department for International Development.

Toufique, K.A. 1997. Some observations on power and property rights in the inland fisheries of Bangladesh. *Word Development* 25(3), 457-467.

Townsley, P. 1998. Aquatic resources and sustainable rural livelihoods. In Carney D. (Ed.), *Sustainable rural livelihoods: what contribution can we make?* London: Department for International Development, 139-153.

van Zalinge, N., Thuok, N., & Seang Tana, T. 1998. Where there is water, there is fish? fisheries issues in the Lower Mekong Basin from a Cambodian perspective. *Crossing boundaries, 7th annual conference of the International Association for the Study of Common Property.* IASCP. Vancouver.

WCD. 2000. Dams and development; a new framework for decision-making. Report of the World Commission on Dams, available at http://www.dams.org/

Welcome, R.L. & Bartley, D.M. 1998. Current approaches to the enhancement of fisheries. *Fisheries Management and Ecology* 5, 351-382.

Williams, S. & Awoyomi, B. 1998. Fish as a prime-mover of economic life of women in a fishing community. Proceedings of the IIFET Conference, Tromso Norway, 8-11 July 1998.

World Bank. 1993. Small-scale fisheries: research needs. WB Technical Paper 152, Fisheries Series, Washington DC: World Bank.

3. SMALL-SCALE FISHERIES: PAST EXPERIENCE AND FUTURE SOLUTIONS

Dr R. Mahon and D. Wilson

SUMMARY

Small-scale management regimes are nearly as unique as small-scale fisheries, although certainly some general lessons about their design can be garnered. In order to describe the development and current condition of small-scale management regimes we chose to begin with descriptions of the small-scale management regimes in place in three geographic locations, the Bay of Fundy, the inland fisheries of Zambia, and the member countries of the Caribbean Community Secretariat (CARICOM). These descriptions begin by outlining the existing fisheries management agencies in each of the cases, and then management measures, stakeholder participation, conflict resolution, resource allocation, monitoring issues are all addressed. The case studies give details about these three unique situations that are then used as examples in the broader discussion that follows.

Drawing on these examples and others, the report addresses several important topics about the design of small-scale fisheries management regimes in general. These include: i) building effective fisheries co-management institutions; ii) ecosystem management; iii) problems associated with small stocks; iv) low perceived value of small-scale fisheries; v) inappropriately structured, planned and operated fisheries departments for small-scale fisheries.

Issue 1: Building effective fisheries co-management institutions

Considerable recent research has focussed on what does and does not contribute to strong co-management institutions. The first lesson, perhaps, is that co-management must involve real cooperation. Where co-management is simply a recruiting tool for inexpensive labour to help the government to enforce its fisheries regulations it is unlikely to succeed. Even if the co-management institutions are maintained, they will not make the contribution to effective management that truly collaborative approaches can make. The second lesson is that co-management institutions that are based on the democratic representation of the fishers have more depth and staying power than those that are not.

The problem that governments face when they seek to manage small-scale fisheries is accountability. How can the government know and influence the kinds of decisions and behaviours that are going on at the local level so that they can insure that they reflect the government's priorities, e.g., the sustainable and equitable use of a large-scale resource. Fishing communities, meanwhile, want to access the governments' higher-scale reach and resources. Two reasons why communities want to involve the government in local fisheries management are common. The first is simply a desire for the money and other resources that co-management programmes frequently make available. In such cases, the community will remain motivated to participate in co-management so long as the money is flowing. The second reason is that the community is facing a conflict situation and wants the government to help them deal with it. Effective co-management will come about when the government can use its authority to contain and channel fisheries conflicts in creative ways. The benefits of co-management are best achieved when the state is willing to surrender real decision-making power, including the legitimacy that only the government can bestow to democratic local institutions, even while holding them accountable for their responses to the needs of the broader society. Such accountability itself can, in fact, increase the effectiveness of co-management institutions when it takes the form of ongoing, outside participation in goal clarification and the evaluation of achievements.

Issue 2: Ecosystem management

Ecosystem management has emerged in several forms in discussions of fisheries management. Approaching fisheries management from an ecosystem perspective is biologically attractive because of its recognition of the reality that fishing is related to a far broader set of problems than simply the impact of harvesting on populations. It is also enormously challenging. Most scientific approaches to ecosystem management, however, use multi-species models that essentially treat ecosystem management as single species management. This leads to overwhelming measurement and analysis problems. From a social perspective, ecosystem management would also result in an exponential increase in the number of groups that would have a stake in any given decision. In fact, the complexity that the management of the marine ecosystem would entail would likely overwhelm any current management institution. The bottom line from these scientific, social and bureaucratic considerations is that ecosystems are not a unit of management that is congruent with democratic, science-driven management as it is carried out on large scales through government bureaucracies. What cannot be done on large scales, however, may be feasible on small scales. Ecosystem management requires the processing of too much biological and social information for which large bureaucracies to handle are required. The ability of institutions on smaller scales to make use of more and more nuanced information suggests that small-scale fisheries are where experiments with real ecosystem management need to begin.

Issue 3: High Diversity of small stocks of low total individual value that does not justify a full conventional stock assessment, target setting and enforcement programme

Although small-scale fisheries are often treated as a discrete category, there in a fact a continuum of fishery types from very small subsistence to enormous industrial types. There may be some value in developing ideas relating to this continuum further as a basis for considering problems of small-scale fisheries. For example, are the types of problems often flagged as relating to small-scale fisheries due to the scale of the fishery, the size/value of the fish stock being exploited or the type of management regime that is often found in situations where small-scale fisheries are prevalent? Taking the above three dimensions may provide a useful framework for considering small-scale fisheries issues. Issues relating to these dimensions and their implications for management are discussed. Inventory of the relative distribution of stocks in this framework would provide the context for a research programme on small-scale fisheries that focusses on the relevant characteristics. For small size/value stocks there is the need to develop approaches that are indicator-based rather than conventional stock assessment, use reference directions rather than targets, and emphasize consensual processes.

Issue 4: Low perceived importance of fisheries in general and small-scale fisheries in particular

In CARICOM countries, with the exception of shrimp fisheries in Guyana and Suriname, and the lobster and conch fisheries in Belize, fisheries are generally perceived to be of low importance relative to other productive sectors. One reason suggested is that Fisheries Divisions are usually situated in ministries that are primarily concerned with agriculture. The backgrounds of the Chief Technical Officer, Permanent Secretary and Minister are usually agriculture related. Furthermore, because fisheries are mainly small-scale and often rural, fishers are usually from the lowest economic strata and have little voice, except when there are crises. By and large, small-scale fishing is perceived by planners and decision-makers as a subsector that takes care of itself. Proper economic evaluation of the value of small-scale fisheries in national economies would go some way towards redressing this situation. In countries with tourism, this must include the value-added by providing inputs to tourism. Often these are counted under tourism earnings. However, knowing the value although necessary, this is not sufficient. There is the need to communicate this to decision-makers and the public at large.

Issue 5: Small poorly managed, unplanned fisheries departments that do not have the range of expertise needed to conduct conventional top down management using assessment-based targets

Problems relating to the actual organization and operation of fisheries departments in countries where small-scale fisheries are predominant may be one of the major reasons for the poor management of these fisheries. In summary, the structure and function of developing country fishery departments, based on levels of financial support that are appropriate to the value of resources to be managed, have not been systematically addressed. Similarly, although the need for improved planning and review processes is frequently identified, there is little to guide managers in these areas. Consequently, systematic action to address these issues has been minimal. This is an area within which there is great potential for input from the field of organizational change management and public administration. In addition to exploring the most appropriate model for fisheries departments of various sizes and with a mandate for various levels of resource value, there is the need to consider the relative capacity that should be established in national and regional institutions. The matter of how fisheries departments are run and of accountability bears further exploration. When there is no plan that sets priorities for a period and is reviewed on a regular basis, there is scope for a great deal of ad hoc activity on the part of fisheries department staff. In summary, the structure and function of developing country fishery departments based on levels of financial support that are appropriate to the value of resources to be managed have not been systematically addressed. Similarly, although the need for improved planning and review processes is frequently identified, there is little to guide managers in these areas. Consequently, systematic action to address these issues has been minimal.

1. INTRODUCTION

Small-scale management regimes are nearly as unique as small-scale fisheries, although certainly some general lessons about their design can be garnered. In order to describe the development and current condition of small-scale management regimes we chose to begin with descriptions of the small-scale management regimes in place in three geographic locations, the Bay of Fundy, the inland fisheries of Zambia, and the member countries of CARICOM. These descriptions address the specific descriptive elements called for in the Terms of Reference (ToR). Then, drawing on these examples and others, we address several important topics about the design of small-scale fisheries management regimes in general. These include: i) building effective fisheries co-management institutions; ii) ecosystem management; iii) problems associated with small stocks; iv) low perceived value of small-scale fisheries; v) inappropriately structured, planned and operated fisheries departments for small-scale fisheries.

2. SMALL-SCALE FISHERIES MANAGEMENT REGIMES IN THREE AREAS

2.1 Small-scale fisheries in the Canadian maritimes: the case of the Bay of Fundy groundfish

2.1.1 Agencies and local institutions

The Canadian Department of Fisheries and Oceans (DFO) has overall responsibility for the system and directly manages an ITQ system for the larger-scale (65 m+) mobile gear fishery. Harvest decisions are made by the Fish Resource Advisory Council (FRAC) while the DFO Science Branch provides analyses of stock status. The small-scale fishery, which consists of < 65 m fixed gear is managed by community management boards that are assigned quotas. The mobile gear boats, all of which are otter trawls, target cod, haddock, pollock and flounder. The fixed gear fleet consists of handline vessels, longline vessels and gill-net vessels, with some vessels fishing different gears at different times. The handlines and longlines target cod and haddock, and the gill-nets target cod and pollock.

2.1.2 Management measures

Beyond setting the quotas, DFO management also issues species-based licenses. A series of technical measures attach to each license. They have also designated marine protected areas, although not in the Bay of Fundy.

The Canadian fisheries management system is a classic, single stock, output control supported by technical measures system. There is no official management unit one could think of as an "ecosystem". However, a number of habitat and bycatch controls, including protections for marine mammals, are in place so that the environmental impacts of fishing activities are considered. The community quotas have also given rise to some local groups that start from the ecosystem level in considering policies and actions. On the Nova Scotia side especially, management institutions are rapidly developing toward an ecosystem perspective because the local management boards are bringing small-scale fishers and environmental activists into contact around concrete programmatic issues.

2.1.3 Stakeholder participation in planning and co-management

The management boards are made up of fishers' groups that represent informally both geographical sub-regions and types of gear. On the New Brunswick side, the community management board is made up of three fishers' groups, one each for two islands and one for the mainland. These geographical divisions correspond strongly, but not absolutely, with the three types of gear. This management board divides their quota among the different gear types and each sub-group is responsible for managing one gear type. However, all three gear-type harvesting plans have to be agreed to by all three fishers' groups. On the Nova Scotia, side the board consists of two fishers' groups, one of which loosely represents the hand-line fishers. The board has three members from each of these groups and is experimenting with having three other members representing community non-fishing interests for some issues. This board also operates by consensus.

Other stakeholder groups consist of fish dealers and some environmental conservation groups. These groups include an environmental non-governmental organization (NGO) in Halifax and another at St.

Francis Xavier University. These two groups address marine resource issues in the larger Maritimes region. Several environmental groups operate at the level of the whole Bay of Fundy and of sections and offshoots of the bay. On the Nova Scotia side, several of these groups are already cooperating closely with the community management board and this trend is growing. The community management board is, in fact, operating as a growing nexus of marine-related environmental action focussed at the ecosystem level.

2.1.4 Conflict resolution

The current Individual Transferable Quota (ITQ)-based management system was set up by a "participatory" system in which DFO selected participants to represent the industry. There is still a great deal of resentment among the "losers" in the process, the major issue being the selection of a particular three-year baseline line to establish individual histories.

The management system is made more inclusive than the Canadian norm through the use of the management boards. This has evolved in two very different directions in the two boards. On the Nova Scotia side the community management led directly to the creation of the Marine Resource Centre, through which they are playing an expanding role in community life and including a steadily broader number of stakeholders with a self-consciously "ecosystem" approach. This has led to the inclusion of non-fishers on the Fundy Fixed Gear Council.

On the New Brunswick side there is a good deal of conflict between the three fishers' groups that make up the board and this has led to a number of ongoing problems. While these problems have not resulted in failure, they have kept the New Brunswick side from developing the broader kinds of institutions and institutional links found on the Nova Scotia side. There are a number of explanations for this, running from the personalities of the people involved to strong differences of interest across gear type, geographical location, especially island v. mainland, and the organizational interest of the three fishers' groups.

2.1.5 Allocation and Management

DFO sets a Total Allowable Catch (TAC) for many important species, including groundfish, area and distributes the bulk of the quota through an Individual Transferable Quota (ITQ) system, some of the quota to the community management boards, with a small remainder of the quota being allocated to "Group X" or open access.

Quotas based on DFO's TAC are the central management measure. The community management boards are mainly concerned with how their aggregate quotas are caught. They rely mainly on trip or weekly landing limits. These measures are made by the management boards themselves.

In the two management boards relevant to the Bay of Fundy all decisions are made by consensus. An interesting development on the Atlantic side, across the Nova Scotia peninsula from the Bay of Fundy, is that the community management boards have evolved an informal ITQ system of their own as a way to manage their aggregate quotas. On the Bay of Fundy side the fishers' groups have resisted attempts to move in this direction.

2.1.6 Monitoring of management performance

Stock assessments for cod, haddock and pollock are performed through formal Virtual Population Analysis (VPAs) with precautionary reference points. The DFO management system is currently examining the option of assessing the Gulf of Maine (which includes the Bay) and the Scotian Shelf stocks separately. The stocks have known biological differences such as growth rate. Sanctions for breaking the fisheries management regulations promulgated by the government are backed up by the full force of law. Community management regulations, on the other hand, are enforced more indirectly. The community management was set up, from a technical, legal viewpoint, as an "option" rather than a requirement for the small-scale boats. These boats can opt to fish for 'Group X' open access quota. But this quota is quickly exhausted, mainly by larger boats operating on the Scotian Shelf. The basic source of enforcement power that the community boards have is that they can refuse to allow a fisher to fish for community quota, effectively forcing this fisher into "Group X". The community management boards have created a set of management measures rooted in this ability to exclude those who do not respect their regulatory structure. These are effort controls aimed at spreading the community quota out over the year to avoid a race for fish. These measures are enforced mainly by fines which are imposed by an anonymous, rotating board that makes decisions about sanctions without knowing the identity of the fisher being sanctioned. This system is reported to work fairly well.

2.1.7 Roles and responsibilities

Decision-making procedures in Canadian fisheries were extensively changed in the early 90s as a response to the groundfish collapse. Before the collapse, fisheries science and management was carried out by a body which had responsibility for the Atlantic zone from Labrador down to the Gulf of Maine and Georges Bank. The new system separated the science advice (DFO) from the harvesting advice (FRAC). FRAC has biologists on staff and consists of representatives from industry and academia. At the community level decisions management boards make decisions about the allocation of quota and seek to ensure that the catch is spread through the year using such measures as days-at-sea.

2.2 Southern African Inland Fisheries - the Case of Zambia

2.2.1 Agencies and local institutions

The Zambia Department of Fisheries (DoF) is charged with the management of Zambia's extensive fresh water fisheries. Since the late 1980s one of their central strategies has been a form of "co-management" in which village and multi-village level committees are formed and given the responsibility to enforce the government's fisheries regulations. These kinds of co-management programmes have been established in three main areas. In Lake Mweru-Luapula River system 78 Village Management Committees (VMCs) were formed with 13 zonal management committees at chiefdom or sub-chiefdom level between 1997-1999. In the Bwangweulu system, which consists of Lake Bwangweulu and the surrounding swamps, there are 39 village management committees organized into six zones each with a zonal committee. On Lake Kariba 40 village communities are organized into four zones.

2.2.2 Management measures

The most important fisheries management measure is a nation-wide closed season from December through February. This time was chosen because there are many fish that spawn during this time and because it is a time of high demand for agricultural labour.

There are also a number of technical measures in the various fisheries such as controls on mesh sizes and bans on specific fishing practices. Most of these banned practices are various forms of "active" fishing, such as seining or driving fish into nets.

2.2.3 Stakeholder participation in planning and co-management

Zambia is in the process of putting together enabling legislation for fisheries co-management, a process which began with proposals from the DoF in 1994. The delay is not due to the co-management provisions but to other aspects of the legislation which involve a major reorganization of the DoF. Currently the DoF operates as a small section within the Ministry of Agriculture, Food and Fisheries and does not enjoy strong access at the Ministerial level (Malasha 2002).

While this legislation is pending, the VMCs remain essentially an education and surveillance extension of the DoF, and sometimes the local Traditional Authority (TA) i.e. a king, chief or sub-chief. The VMCs are not empowered to create fisheries management measures. Currently, the DoF and the TAs are the only legal and effective authorities that can make and enforce fisheries regulations. The VMC's main function is to go on patrols and find fishers that are breaking the fishing rules. When such violations are aggravated or repeated they may fine the violators or confiscate the fishers gear, but these punishments must later be confirmed by the DoF or a TA. Village committees are quite aware of the pending fisheries legislation and its implications, but their most articulated desire for increased powers is for more formal powers of arrest rather than the ability to create fisheries rules.

The degree to which the lower-level DoF officers in the villages actually work with the VMCs is variable. In some places the relationship is not at all cooperative. This is a violation of DoF policy and reflects the attitudes of individual officers.

In all three areas the co-management projects are supposed to be funded through the collection of taxes on behalf of local authorities called District Councils. The district council is entitled to 100 kwatcha for each kg of fish caught. At the present time only 10-15 percent of this revenue is ever collected. The intent is that the co-management program can facilitate the collection of these funds in return for operating funds for themselves and small-scale development programmes in the village. This cooperation with the District Councils has not yet emerged; in Lake Kariba at least this was due to the inability to agree on how the funds would be shared.

2.2.4 Conflict resolution

There is a substantial migration of fishers into the fisheries and between one fishery and another. This raises considerable tension which often takes the form of accusing the migrants of introducing damaging fishing gear. The question of how to deal with the immigrants, and what kinds of authority the committees have to deal with the immigrants, comes up often at VMC meetings. Research has suggested that these co-management committees are more effective and self-motivated institutions in areas where there are conflicts with in-migrants.

The most extreme example of such conflict took place on Lake Kariba. Lake Kariba is an artificial lake and its creation simultaneously reduced the amount of land available to the local Tonga people and attracted fishers from the rest of Zambia. Strong tensions arose both over fishing and access to land. In 1994 a donor funded fisheries co-management programme was launched through a planning workshop which was made up almost entirely of various kinds of government officials and Tonga TAs. The 2000 fishers in the fishery were represented by seven of the 56 participants (Malasha 2002). The workshop agreed that all fishers should be moved to designated fishing villages. This idea was strongly supported, and its implementation funded, by semi-industrial pelagic fishing concerns that had been losing large amounts of their catch through crew members selling fish to other fishers in fish camps, especially on islands in the lake. The implementation of this concentration affected almost entirely the immigrant fishers because fishers who also had farms, i.e. the Tonga, were allowed to keep fishing from the farms. A great many fishers resisted the exercise and chose to leave the fishery. The number of fishers fell from 2 283 in 1993 to 1 355 in 1995 (Malasha 2002). Because of their concentration in the villages, however, the immigrant fishers began to dominate elected posts in the VMCs. Tonga fishers in the villages were marginalized and the immigrants increased their control over access to both fish resources and general assistance from NGOs (Malasha 2002).

2.2.5 Allocation and management

Allocation and management is a primary issue in these fisheries. Recent combined biological and social research (Jul-Larsen et al. 2002) suggests that the pulsating water volumes that characterize most of Africa's inland fisheries, including those discussed here, create patterns of fish reproduction, growth and mortality such that overfishing from increases in numbers of fishermen has little effect. They do not extend this argument to increased fishing pressure resulting from increased capital investment and technological change, rather it is restricted to simple changes in the numbers of fishers. They further argue that African inland fisheries represent a critically important cushion against hunger within a highly variable agricultural system. They conclude from this that restrictions on access to fisheries do little to improve fisheries production while cutting off an important option for both rural households and urban consumers.

2.2.6 Monitoring of management performance

Zambian fisheries management is based on relatively little current biological information. The actual effectiveness of the implemented management measures is unknown and is being called into question (Jul-Larsen et al. 2002). The measures themselves are more effectively enforced than is often the case in Africa. The single nation-wide closed season allows the DoF, and other government agencies such as the police, to monitor the movement of fish on the highways. This makes it difficult for fish traders to take the fish to the cities and is quite effective in reducing the demand for fish in the fishing areas during the closed season. Fishing for subsistence and some trading still goes on, but fishing activities are noticeably reduced during this period.

The DoF carries out patrols to enforce both the closed season and the technical measures, but this is not an extensive effort due to both limited resources and the co-management strategy. The VMCs also carry out enforcement patrols; it is their primary role.

2.2.7 *Roles and responsibilities*

Co-management programmes have evolved in Zambia in various ways because of the different inceptions, particularly the different NGOs and donors involved. The Norwegian Agency for International Development (NORAD) was a driving force on Lake Kariba as was the Swedish Environmental Protection Agency (SNV) on Bwangweulu and in the Mweru-Luampula system. SNV volunteers have played a very central role in the co-management efforts until the late 1990s, since then SNV has pulled back and encouraged DoF to take a greater lead. The World Wildlife Fund (WWF) was involved in the initial stages in co-management in the Bwangweulu system but pulled back after some disagreements with the DoF. The International Union for Conservation of Nature and Natural Resources (IUCN) launched a small co-management effort in the Upper Zambezi that collapsed when the donor funding was withdrawn.

In the Mweru-Luampula system and on Lake Kariba the traditional leaders are heavily involved in the co-management. In the Bwangweulu system their relationship to the co-management efforts is more ambiguous. Here both the DoF and SNV have concluded that there is too much dependence on the chiefs in the other programmes, particularly on Lake Kariba and have adopted a policy of trying to limit TA involvement in the programme.

2.3 The Wider Caribbean with emphasis on CARICOM countries

The Wider Caribbean Region[1] extends from the mouth of the Amazon River on the north coast of Brazil through the Caribbean Sea, including all coastal countries, to the east coast of Florida, USA and the Bahamas. There are 28 countries represented in the Wider Caribbean. Throughout the region, the majority of the population inhabits the coastal zone, and there is a very high dependence on marine resources for livelihoods from fishing and tourism, particularly among the Small Island Developing States (SIDS), of which there are 16 independent states, while all 14 of the dependent territories are SIDS.

The countries of the region range from among the largest (e.g. Brazil, USA) to among the smallest (e.g. Barbados, St. Kitts and Nevis) in the world, and from the most developed to the least developed. The World Bank classifies Aruba, Bahamas, Bermuda, Cayman Islands, USA and the US Virgin Islands as developed (high income). All other countries are developing, with most being upper or lower middle income, and two being low income. The countries of the Caribbean Community and Common Market (CARICOM)[2] form a political entity comprising mainly ex-British colonies, recently Suriname and Haiti have joined.

The fisheries of the Wider Caribbean Region are based upon a diverse array of resources (FAO 1993, Mahon 2002). Those of greatest importance are for offshore pelagics, reef fishes, lobster, conch, shrimps, continental shelf demersal fishes, deep slope and bank fishes and coastal pelagics. There is a variety of less important fisheries, such as marine mammals, sea turtles, sea urchins, and seaweeds.

The fisheries of the developing countries of the Caribbean use a wide variety of gear, and are primarily artisanal[3], or small-scale, using open, outboard powered vessels 5-12 m in length. The most notable exception are the shrimp and demersal finfish fisheries of the Brazil-Guianas shelf, where trawlers are in the 20-30 m size range, and the tuna fishery of Venezuela which uses large (>20 m) longliners and purse seiners. In many countries there has been a recent trend towards more modern mid-size vessels in the 12-15 m range, particularly for large pelagics, deep-slope fishes and lobster and conch on offshore banks (FAO 2002). Given the seasonal nature of large pelagic fish availability, vessels are often multipurpose and switch between these fisheries sequentially throughout the year.

---

[1] As defined by the United Nations Environmental Programme (UNEP), Regional Seas Programme. This area corresponds approximately to FAO Fishing Area 31.

[2] Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago.

[3] Fisheries and fishing vessels will be referred to as artisanal, small-scale commercial and large scale commercial. These categories provide an artificial but convenient means of referring to the scale of the fishery. Artisanal is used to refer to small traditional vessels such as canoes and pirogues using traditional gear, small-scale commercial implies vessels which are using more modern technology and gear, and are usually less than 15-18 m. Large-scale commercial refers to larger industrial vessels.

2.3.1 Agencies and institutions

Central agencies

The region is characterized by a diversity of national and regional governance and institution arrangements, stemming primarily from the governance structures established by the countries that colonized the region. Owing to this and to the diversity in size and state of development of Caribbean countries, there is an extremely wide range in their capacities for fishery management.

In Caribbean countries the management of capture fisheries is the mandate of the government Fisheries Department. These vary widely in staffing and in the level of training of their staff. At the top end of the range are the USA and Mexico with substantial federal and state fisheries agencies. At the low end are countries such as St. Kitts and Nevis and dependencies such as the British Virgin Islands and Montserrat with Fisheries Departments comprising only a few persons. There has not been any systematic comparative review of the structure and function of Caribbean Fisberies Departments, but a baseline review of 12 CARICOM countries recognized a wide range of capability even within these countries, which are all at the lower end of the capacity scale (Mahon and Boyce 1992).

Whereas one ministry has primary responsibility for fisheries, several others usually have an important role to play in fisberies development and management: ministries of foreign affairs are key players in any approach to management that involves international relations, which given the proximity of states in the Caribbean often involves small-scale fisheries; trade ministries are key to fisheries that export, e.g. conch and lobster; certification and Hazard Analysis Critical Control Point (HACCP) management are often under the control of health ministries; enforcement is usually a matter for the Coast Guard. However, cross-sectoral coordination and cooperation is a weak area for many Caribbean countries.

In addressing the management regime for small-scale fisheries in Caribbean countries, it is necessary to consider the possible role of other institutions with expertise in marine resource management and maritime affairs as sources of technical input, when fisheries departments are weak. Many larger countries in the Wider Caribbean have universities and institutes that can provide expertise, or be encouraged to develop programmes that support fisheries management, e.g. USA, Mexico, Cuba, Venezuela and Colombia. There are few such institutions in the small, less-developed countries. In CARICOM countries, there are the University of the West Indies, the University of Guyana and the University of Suriname. These have very limited capacity in the area of fisheries and oceanography.

National agencies must be considered in the context of the several regional initiatives aimed at enhancing capacity for management of small-scale fisheries through coordination, sharing of information and pooling of resources. Some examples are: the Western Central Atlantic Fisheries Commission (WECAFC) of the Food and Agriculture Organization of the United Nations (FAO) which has been a primary forum for fisheries personnel to exchange technical information; Latin American Organization for Fishery Development (OLDEPESCA) which is the successor to the SELA Action Committee on Seafood and Freshwater Products; The CARICOM Caribbean Regional Fisheries Mechanism (CRFM), a permanent regional fisheries mechanism which was recently established (March 2003) to provide support to its member countries; United Nations Educational, Scientific and Cultural Organization (UNESCO), International Oceanographic Commission, Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), Colombia. The influence of these has been mainly at the technical level. A few other regional organizations have a mandate to facilitate regional-level management of fishery resources, to promote interchange of information and to build marine science capacity but are little involved in direct management.

The need for regional cooperation in fisheries management as a means of enhancing capacity of small fisheries departments is well appreciated, but there is a large number of agencies in the mix. These often compete for the attention of the relatively small number of staff in fisheries departments and may at times even duplicate efforts.

The role of international agencies e.g. The International Commission for the Conservation of Atlantic Tuna (ICCAT) must be borne in mind as many Caribbean small-scale fisheries exploit tuna resources and must be managed with reference to ICCAT.

2.3.2 Management measures

Traditional management measures have not been reported to occur in many places in the Caribbean. It has been argued that most Caribbean peoples are not indigenous and thus being relative newcomers to the area there may not have been sufficient time for traditional management to develop as it has elsewhere, for example in Oceania. There are some examples of traditional measures, e.g. rules to reduce conflict in Grenada seine fisheries and promote conservation in Barbados sea urchin fisheries. Perhaps other examples exist, but not much effort has gone into finding them in the Caribbean.

The main means of regulating small-scale fisheries has been area and seasonal closures, gear regulations, chiefly mesh size of traps and nets, but also banning of scuba, and banning of destructive fishing practices such as blast fishing and trammel nets. In cases of extreme depletion, such as is often the case for easily exploited inshore resources like conch and sea urchins, there have been complete closures for extended periods.

Limited access is almost unheard of in small-scale fisheries in the Caribbean, except in Cuba and US territories. Such fisheries are often perceived as a last-resort means of making a living for the poorest persons. Thus preventing them from fishing is seen as taking away any chance of making a living and is politically unacceptable.

2.3.3 Stakeholder participation in planning and co-management

Stakeholder involvement in planning and/or the management process is a very new concept in the Caribbean. Fisheries Advisory Committees (FACs) are about as far as it goes in most countries, and FACs are seldom very active or influential. Exceptions exist, such as in the case of the Belize Fisheries Advisory Board, which plays a strong role.

Consciousness regarding the need to involve stakeholders in planning and management is growing in the region. There are several recent projects aimed at studying and enhancing co-management. Much of the effort aimed at involving stakeholders relates to the management of marine protected areas and is conservation rather that fishery oriented, although fisheries objectives are often cited with the hope of engaging fishers.

At this time, consultation is the main mode of involving stakeholders in fishery management. There are few reported examples of fishery comanagement in the Caribbean involving the delegation of management authority to stakeholders. The Portland Bight and Negril Management Areas in Jamaica are notable examples in which authority for management of the fisheries in a designated area has been delegated to an NGO. Both cases are relatively new and it is too early to determine if they are sustainable.

2.3.4 Fishery organizations

Attempts at establishing fisheries cooperatives have a long history throughout the Caribbean. However, there are few examples of cooperatives that have become strong and sustainable. The cooperatives in Belize are the best known examples. They are based primarily on the valuable conch and lobster fisheries there, and have played a central role in processing and exporting. Similarly in Guyana, the Georgetown Cooperative has been strong and active in managing the fisheries complex there. Recent initiatives have been more oriented towards promoting fisherfolk organizations, as interest groups, rather than cooperatives as economic entities. The stated purpose of these initiatives has been to give fisherfolk a collective voice in management. This has been recognized as being particularly needed in countries where there is a strong tourism sector, which tends to compete with fisheries for marine and coastal space. In many countries small-scale fisheries have been marginalized by tourism. At the same time, the tourism sector complains about lack of availability of fishery products. There is the need for such organizations to demonstrate successes in order to convince the wider fisherfolk community that they are worth supporting. At present they tend to be supportive only in times of crisis. To achieve the successes needed to gain credibility, considerable strengthening through capacity-building and ongoing support in planning and implementing activities will be required (McConney et al. 1998).

2.3.5 Conflict resolution

Conflict management among stakeholders through negotiation and mediation is a not the cultural norm in most CARICOM countries. Mediation is only recently being seen as a useful complement to the judiciary system in most Caribbean countries. These types of skills are rarely present in government fisheries divisions, given the primarily biological background of staff in most cases, and even more rare in fisherfolk organizations. Berkes et al (2001) point out that the role of the fisheries officer is changing, particularly with regard to small-scale fisheries, where management may be more people-based than science-based, towards one where mediation, facilitation and organizational skills will be most important. There is the need to ensure that managers have these skills.

2.3.6 Allocation and management

Attempts to allocate resources to different user groups are primarily through zoning, involving Marine Protected Areas (MPAs) in particular. In the case of MPAs, fishers are prevented from fishing, or restricted in how they may fish, usually in favour of tourism but also for conservation purposes. However, most MPAs in the Caribbean are "paper parks" with little enforcement of restrictions.

Given the lack of limited entry or controls on total allowable catch in most Caribbean countries there are few reported examples of resource allocation among users within fisheries. Conch in Jamaica is a notable example where spatial and allowable catch limitation were placed on the large commercial vessels in favour of small-scale fishers on Pedro Bank (Aiken et al. 1999). Zoning is also used to separate activities of small-scale and large-scale commercial fishing in shrimp fisheries in Trinidad.

2.3.7 Monitoring of management performance

Few countries have fishery management plans that require systematic review of management performance. Thus there is little information upon which to base comments. Monitoring the status of fisheries is one key means of determining if management is working. Time series of landings and catch per unit effort are basic data for such monitoring. Establishing catch and effort monitoring systems in Caribbean countries has been a major thrust of the CARICOM Fisheries Programme over the past 12 years. However, in most countries it is usual to find data being collected according to a routine with little analysis beyond the simple statistical output of reporting annual production figures for national and international organizations (FAO 2002).

2.3.8 Roles and responsibilities

Management in Caribbean countries remains essentially top-down, with consultation. Consequently, given the difficulties involved in dealing with widely dispersed, mainly rural small-scale fisheries, little management actually takes place. Closed seasons for species that are primarily exported are most strictly observed, because they can be controlled through export permits, although in some places over the side sales to vessels from neighbouring countries with different closure periods is problematic. In the eastern Caribbean, harmonization of regulations among countries helps to address this problem. There is widespread recognition that comanagement is desirable, but neither government nor stakeholder organizations are equipped to move rapidly in that direction.

Conservation NGOs are having an increasing influence on small-scale fisheries in the Caribbean, primarily through the promotion of MPAs as a management tool. Regional and national NGOs also promote protected areas, but are much less strong less well funded than their international counterparts. The situation with fisherfolk NGOs has been described above. In the Portland Bight area mentioned above, the use by the managing NGO of local rangers for enforcement is reported as working well.

3. ISSUES FOR MANAGEMENT REGIMES

The following five issues were identified as key for consideration in developing a research programme for small-scale fisheries:

1. Lessons from fisheries co-management.

2. Small-scale fisheries management and ecosystem management.

3. High diversity of small stocks of low total individual value that does not justify a full conventional stock assessment, target setting and enforcement programme.

4. Low perceived importance of fisheries in general and small-scale fisheries, in particular.

5. Small poorly managed, unplanned fisheries departments that do not have the range of expertise needed to conduct conventional top-down management using assessment-based targets.

Issue 1: Lessons from fisheries co-management[4]

Co-management is a rapidly expanding model for fisheries management that has enjoyed wide support by both donor agencies and NGOs. Sen and Nielsen (1996) define co-management as: "an arrangement where responsibility for resource management is shared between the government and user groups" (406). McCay and Jentoft (1996) are more specific when they describe co-management as cooperative fisheries management where "the basic principle is self-governance, but within a legal framework established by government, and power is shared between user groups and the government" (239). Co-management mobilizes several assets to aid effective management. One is facilitated access to information (Pinkerton 1989). Others are increased legitimacy through increased transparency in decision-making (Jentoft 1989), greater accountability for officials (Magrath 1989), and increased respect for indigenous perspectives (Pomeroy and Carlos 1997). Co-management has a mixed record of success (Wilson, Nielsen and Degnbold 2003) but the most effective small-scale fisheries management institutions are, to a growing degree, co-management institutions (Raakjaer-Nielsen *et al.* 2002) .

Considerable recent research has focussed on what does and does not contribute to strong co-management institutions (Raakjaer-Nielsen *et al.* 2002, Wilson Nielsen and Degnbold 2003). The first lesson, perhaps, is that co-management must involve real cooperation. Where co-management is simply a recruiting tool for inexpensive labour to help the government to enforce its fisheries regulations it is unlikely to succeed. Even if the co-management institutions are maintained, they will not make the contribution to effective management that truly collaborative approaches can make (Raakjaer-Nielsen *et al.* 2002).

The second lesson is that co-management institutions that are based on the democratic representation of the fishers have more depth and staying power than those that are not. Hara *et al.* (2002) in their comparative case studies of co-management in Malawi found that close involvement by non-democratic traditional authorities (TA) had a negative influence on the effectiveness of the management regimes. Similar lessons are emerging from community-based natural resource management approaches to many resources throughout the world (Ribot 2002).

Effective environmental management is management that can process and respond well to biological and social information, i.e., management that is adaptive whether it uses that term or not. One way to think about the contribution that co-management can make to fisheries management, and the motivations behind participation in such programmes, is to look at the problem in terms of information processing across scales. The smaller the scale an institution is operating on the better able it is to understand and respond to rich, nuanced information. When seeking to manage large-scale problems, governments rely on bureaucratic authority, and sometimes market-based mechanisms, because these approaches create cooperation through simple decisions in response to strong, clear incentives that operate predicably across large scales. Markets and bureaucracies, however, are poor at processing and responding to complex information, such as scientific data about rapidly changing fisheries (Wilson 2003).

---

[4] Much of the material in this section is taken from Wilson (2003) and expanded upon.

The problem that governments face when they seek to manage small-scale fisheries is accountability. How can the government know and influence the kinds of decisions and behaviours that are going on at the local level so that they can ensure that they reflect the government's priorities for, e.g., the sustainable and equitable use of a large-scale resource? In creating co-management institutions, the government desires to make use of the richer information processing mechanisms embedded in local cultures to facilitate this accountability. The government's motivation for participating in co-management begins with its need for the communities' help in dealing with aspects of management that require richer, more sensitive and subtle tools than bureaucratic authority provides.

Fishing communities, meanwhile, want to access the government's higher-scale reach and resources. Two reasons why communities want to involve the government in local fisheries management are common. The first is simply a desire for the money and other resources that co-management programmes frequently make available. In such cases, the community will remain motivated to participate in co-management so long as the money is flowing. The second reason is that the community is facing a conflict situation and wants the government to help them deal with it. For these communities, government involvement holds two attractions: giving legitimacy to particular objectives and local groups, and managing the broader conflicts.

Stakeholder conflicts in fisheries are situations of both problem and possibility. It is communities that need government help in resolving conflicts that are the most ripe for the creation of effective, self motivated, co-management institutions. Such institutions can be of great use, in turn, to a government trying to hold a local community accountable to a larger scale need. Situations where co-management has the greatest possibility for success will often be situations of conflict.

Of course, conflicts also undermine management efforts. In the Canadian case described above the community management boards were invested with government legitimacy to resolve the conflicts that emerged in the sharing of a decreasing groundfish quota. The ongoing need to deal with these conflicts has meant that both of the boards have continued to function, but one board has proved a stronger institution because of a larger capacity for conflict resolution.

Effective co-management will come about when the government can use its authority to contain and channel fisheries conflicts in creative ways. This means using its rule-making authority to make it possible for more open and culturally embedded communications to play an effective role in conflict resolution and other local decision-making processes. Other examples beyond the Canadian case exist (Wilson Nielsen and Degnbold 2003). The creative channelling of conflict does require, however, that the state use its authority for this purpose rather than attempting to micro-manage the fishery. The benefits of co-management are best achieved when the state is willing to surrender real decision-making power, including the legitimacy that only the government can bestow, to democratic local institutions, even while holding them accountable for their responses to the needs of the broader society.

Such accountability itself can, in fact, increase the effectiveness of co-management institutions when it takes the form of ongoing, outside participation in goal clarification and the evaluation of achievements. This is true both of co-management programmes involving the state and emerging possibilities of ecolabelling in small-scale fisheries management in which certification programmes use the high scale power of the market, rather than of the state, to achieve a similar purpose. There are a great many problems involved in certification of small-scale fisheries, but this approach does hold real potential if it is conceived as a mechanism of ongoing accountability to locally created and globally ratified management goals that strikes the right balance between firm accountability to goals and transparency about ways to achieve those goals.

Issue 2: Small-scale fisheries management and ecosystem management

Making use of the richer information that smaller scale institutions are able to work with is the key to understanding the ecosystem management problem. Ecosystem management has emerged in several forms in discussions of fisheries management (McCay and Wilson 1997). Approaching fisheries management from an ecosystem perspective is biologically attractive because of its recognition of the reality that fishing is related to a far broader set of problems than simply the impact of harvesting on populations. It is also enormously challenging. In a number of contexts it has been defined as "multispecies management" wherein a management is designed around several interacting species. Ecosystem management has also been promoted by those seeking fundamental reforms in the way we defined fisheries management, on such example being the "parametric management" approach of Wilson and Dickie (1995). Most scientific approaches to ecosystem management, however, use multi-species models that essentially treat ecosystem management as single species management. This leads to overwhelming measurement and analysis problems (Degnbol 2003). From a social perspective, ecosystem management would also result in an exponential increase in the number of groups that would have a stake in any given decision. In fact, the complexity that the management of the marine ecosystem would entail would likely overwhelm any current management institution. Nor do ecosystem approaches reflect the realities of managing behaviour through bureaucratic authority. Bureaucracies depend on calculable rules to trigger responses (Porter 1995), while ecosystem approaches present complex interactions of parameters that are difficult to quantify and impossible to interpret in real, decision-making time. More fundamental, the concepts needed to make ecosystem management work do not translate into firm, legal definitions, even ones as simple as boundaries (Haueber 1996). Ecosystem approaches depend on the flexibility to make changes in response to shifting system parameters.

The bottom line from these scientific, social and bureaucratic considerations is that ecosystems are not a unit of management that is congruent with democratic, science-driven management as it is carried out on large scales through government bureaucracies. Studies of the application of the ecosystem concept in environmental management in practice have demonstrated this empirically (Yaffee 1996). What cannot be done on large scales, however, may be feasible on small scales. Ecosystem management requires the processing of too much biological and social information for large bureaucracies to handle. The ability of institutions on smaller scales to make use of more and more nuanced information suggests that small-scale fisheries are where experiments with real ecosystem management need to begin.

The Canadian experience described above is one instructive case. The community management boards emerged to deal with conflicts created by the allocation of an aggregate quota. In the one case where they were successful in dealing with these conflicts the local institution, rather than simply carrying on with that task, began to be involved in a wider and wider set of problems related to the management of the Bay of Fundy. They are now centrally involved in a network of local groups focussed on management issues around the Gulf of Maine. Nor is this the only case; the increasing involvement of the Sea Fisheries Committees that handle small-scale fisheries management in the UK, with the management of EU Special Conservation Areas, are another example. Co-management systems that incorporate the principles outlined in Issue 1 may be one key to making the kinds of changes in human management institutions that will make ecosystem management a feasible alternative.

Issue 3: High diversity of small stocks of low total individual value that does not justify a full conventional stock assessment, target setting and enforcement programme

Although, for discussion purposes, small-scale fisheries are often treated as a discrete category, they are in fact a continuum of fishery types from very small, subsistence to enormous, industrial. There may be some value in developing ideas relating to this continuum further as a basis for considering problems of small-scale fisheries. For example, are the types of problems often flagged as relating to small-scale fisheries due to the scale of the fishery, the size/value of the fish stock being exploited or the type of management regime that is often found in situations where small-scale fisheries are prevalent? Unravelling this is clearly beyond the scope of this brief report, but it may be possible to raise some points that can be considered in further discussions.

Taking the above three dimensions may provide a useful framework for considering small-scale fisheries issues. It encompasses all fisheries.

> Dimension 1 is the **scale of the fishery**, ranging from subsistence through artisanal, small-scale commercial to large-scale commercial or industrial.
>
> Dimension 2 is the **size/value of the stock fished**, which may range from a few tonnes to over a million tonnes.

> Dimension 3 is the **management organizational context**, ranging from a very small fisheries management organization with low capacity and low related support to a large, fully developed management system with science, administrative, enforcement and judiciary support.

These dimensions are not unrelated and have other correlates such as temperate-tropical axes and developed-developing country axes, that make it difficult to frame the problems seen in small-scale fisheries as purely due to the scale of the fishery. Ideally, to explore this approach, one would look at the distribution, relative frequency of occurrence, and total value (dollar, employment, food security) of global fisheries in this three-dimensional space. Then the issues relating to management for the different parts off the space could be considered, with reference to possible solutions and the appropriate investment of research and management effort according to value. That would be a substantial research effort in itself, largely because the data on stock size/value is scarce. Much fishery data is reported in aggregate form, certainly at the national level, without regard to stock unit size. Some observations on the characteristics of fisheries that occur in different parts of the three-dimensional space are provided in Table 1. These illustrate possible different needs for small-scale fisheries in different situations. This table is not intended to be comprehensive, but rather to illustrate an approach to expanding upon the usual small-scale/large-scale continuum and to emphasize that many apparent problems of small-scale fisheries may not be due only to the scale of the fishery.

Table 1. Characteristics and issues for management of small-scale fisheries in various parts of a management regime framework based on three dimensions: Management organization and capacity; stock size; and fishery scale

Management organization and capacity	Fishery scale	Stock size	Characteristics	Management issues
A. Well developed (usually developed country)	**I. Small**	**a. Small**	Small-scale fisheries on small stocks are common in developed countries, often by indigenous peoples and in rural areas.	These fisheries tend to be less well managed than the larger scale fisheries on large stocks as the latter are higher priority. However, they do get some spin-off attention from the capacity that is there to deal with large-scale/large-stock fisheries. In particular, when politically necessary, resources can be diverted to these fisheries.
		b. Large	These are usually part of a fishery system that includes large-scale fishing.	These fisheries tend to get management attention as part of the management package for the large-scale fisheries, or take too small a proportion of the stock to have an impact
	II. Large	**a. Small**	Few large-scale fisheries tend to develop on small stocks, except where there are many of them in close proximity. Offshore salmon would be an exception, where the aggregate of the small stocks is large.	These stocks usually get management attention due to the aggregate value and profile of the industry.
		b. Large	These are the major resources upon which most of conventional fishery management and assessment has focused.	Poor history of management, but nonetheless sufficiently valuable that managers continue to invest resources into assessing and managing.
B. Poorly developed (usually developing country)	**I. Small**	**a. Small**	Globally there must be a very large number of such fisheries. Characteristically, these will be tropical, rural, coastal and inland (similar to A.i.a).	Individually, these fisheries are not sufficiently individually valuable to warrant conventional approaches. Technically, assessing them and making management decisions using conventional management approaches would require similar levels of expertise and institutional arrangements as management of a large, valuable stock. This is seldom economically justifiable. Consequently, they receive little or no management attention (unless traditional management practices are in place). Their small size means that they are vulnerable to depletion by small-scale, local fisheries.
		b. Large	These are usually part of a fishery system that includes large-scale fishing (similar to A.i.b)	These fisheries may take only a small proportion of the total catch and may tend to be marginalized even when there is substantial management attention on the large-scale fishery for the stock.
	II. Large	**a. Small**	Few large-scale fisheries tend to develop on small stocks, except where there are many of them in close proximity. No developing country examples come to mind.	If large-scale fisheries have developed on small stocks in countries with poor management, they usually attract outside attention, often because the fishery is based on outside investment.
		b. Large	These are also the major resources upon which most of conventional fishery management and assessment has focused. These fisheries often attract foreign investment and distant water fleets.	The value of, and foreign interest in these fisheries may lead to greater attention to assessment and management.

Inventory of the relative distribution of stocks in this framework (or some variation) would provide the context for a research programme on small-scale fisheries that focussed on the relevant characteristics (Mahon 1997). For small size/value stocks there is the need to develop approaches that are indicator-based rather than conventional stock assessment, use reference directions rather than targets and emphasize consensual processes (Berkes *et al.* 2001).

Issue 4: Low perceived importance of fisheries in general and small-scale fisheries in particular

In CARICOM countries, with the exception of shrimp fisheries in Guyana and Suriname, and lobster and conch fisheries in Belize, fisheries are generally perceived to be of low importance relative to other productive sectors. One reason suggested is that Fisheries Divisions are usually situated in ministries that are primarily concerned with agriculture. The backgrounds of the Chief Technical Officer, Permanent Secretary and Minister are usually agriculture related. Furthermore, because fisheries are mainly small-scale and often rural, fishers are usually from the lowest economic strata and have little voice, except when there are crises. By and large, small-scale fishing is perceived by planners and decision-makers as a subsector that takes care of itself. Despite clear evidence of overexploitation of most coastal resources, there is reluctance on the part of decision-makers to actively manage these resources. Left alone, the small-scale fishers go about their business quietly, but with low returns from depleted resources. Attempts to impose management regulations on them often leads to unfavourable political exposure due to the perception that the livelihoods of the poor fisher is being threatened.

Where tourism is an important sector, small-scale fisheries are often marginalized by demands for coastal space, particularly in SIDS where space is limited. There is little in the way of integration of fisheries with tourism. Important linkages wherein fisheries provide inputs to the tourism restaurant sector and thus considerable value added when the product is served as a meal, rather than exported, are often overlooked.

The above situation has been exacerbated by the lack of good information on the value of fisheries, and/or the potential benefits from fisheries management. As a consequence, fisheries management controls are minimally developed and seldom enforced in CARICOM countries. The situation appears to be similar in other developing countries of the Wider Caribbean, with the exception of Cuba, where there is evidence that management control has brought benefits in several fisheries (Claro *et al.* 2001).

Little emphasis has been placed on quantifying and promoting the importance of small-scale fisheries in CARICOM. It may be thought that when there are good functioning data systems for monitoring fisheries performance these will provide the necessary information. After 12 years of work on data systems by the CARICOM Fisheries Programme, there has been little output oriented towards documenting the value of small-scale fisheries.

Proper economic valuation of the value of small-scale fisheries in national economies would go some way towards redressing this situation. In countries with tourism, this must include the value added by providing inputs to tourism. Often these are counted under tourism earnings. However, knowing the value although necessary is not sufficient. There is the need to communicate this to decision-makers and the public at large. The collective voice that fisher associations should give fishers could make a substantive contribution to raising the profile of small-scale fisheries and an appreciation of their value.

Programmes to quantify the occurrence, and value of small-scale fisheries would help to redress this problem. Often, when one refers to valuation of small-scale fisheries, the response from national agencies is that it would require major social and economic surveys, the cost of which could not be justified. Berkes *et al.* (2001) suggest that the information could be acquired at the level of accuracy needed to persuade the public and decision-makers through much simpler surveys than are often proposed. Development, documentation and sharing of simple reasonable methods for arriving at estimates of small-scale fisheries value and value added would assist in addressing this need. These methods could focus of the use of single/one-off studies at intervals (e.g. 5-10 years), rather than on setting up ongoing systems for monitoring economic performance. The latter although possibly necessary for monitoring fisheries performance for management do not seem to capture small-scale fisheries information in a form needed to document and promote their value.

Issue 5: Small poorly-managed, unplanned fisheries departments that do not have the range of expertise needed to conduct conventional top-down management using assessment-based targets

Problems relating to the actual organization and operation of fisheries departments in countries where small-scale fisheries are predominant may be one of the major reasons for the poor management of these fisheries. This is particularly so when conventional management approaches are percieved as being the desired, if not the only, approach to managing these stocks. This has been considered to some extent under Issue 3 above, but bears further examination. For a start, there is the need to consider the extent to which small-scale fisheries require a completely different structure and staffing of fisheries departments compared to that of large-scale conventional fisheries management. As previously described in this paper, most fisheries departments have a bias towards biological expertise with limited skills in facilitation, mediation and conflict resolution. Furthermore, even the dominating biological expertise is not the most appropriate biological expertise for dealing with the complexity of small-scale fisheries.

The lack of guidelines for appropriate expenditure on management for a given resource value (if it were known) is a root cause of the evident lack of planning in CARICOM countries for human resource development for fisheries departments that includes clearly stated structures and targets. This has contributed greatly to the instability in fisheries departments. Because there are no guidelines, fisheries department size and structure has generally been an ad hoc decision based on the decision-makers perception of the value of fisheries, and the persuasive power and/or position of favour, of the department chief. This issue is closely linked to the one above regarding low perceived value of small-scale fishery resources, particularly when the whole fishery sector is a suite of small-scale fisheries on small/low individual value stocks (regardless to the overall value of the sector).

It appears obvious that the level of investment in management should generally be related to the value of the resource (that may include non-fishery worth such as for biodiversity, culture, religion or ecosystem integrity). However, there is a lack of analyses that lead to easily applicable formal or informal rules to guide the manager in determining an appropriate level of investment. Indeed there are few studies that even quantify existing levels of investment (Arnason, Hannesson and Schrank 2000). For large-scale fisheries in developed countries, the costs of management may be substantial and variable, ranging from 3 percent of the value of the fishery in Iceland through 10 percent in Norway to 15-25 percent in Newfoundland, Canada (Arnason, Hannesson and Schrank 2000). This is an area in which there is the need for further analysis by fisheries economists with the aim of providing managers with at least some rules-of-thumb regarding appropriate levels of investment.

The approach of quantifying the costs of not managing in order to determine an appropriate level of expenditure on management should be explored. There can be many social and economic impacts of not managing a fishery (Berkes *et al.* 2001). Incentives for investment in management may be higher where the fishery has additional value to the country, such as providing foreign exchange, or where the fishery products are culturally important. In the latter case, the value placed on a fishery may be much higher than its measured economic value.

Serious attention to the economic value of fisheries and guidelines for the appropriate levels of national budget for management could provide a basis for more planned and structured departments.

Even if there were a clear view of the appropriate amount of public investment in fishery management and development, there is little to guide the manager as to the appropriate organizational arrangements for a developing country fisheries department. Attention to guidelines for fisheries department structure and function could make a substantial contribution to the effectiveness of developing country fisheries departments. There is a large sample of developing country fisheries departments from which to learn what has worked, what has not, and why. An international study of existing arrangements in the context of various organizational models is called for.

Many developing country department chiefs appear to take the view that in order to manage fisheries effectively they need the full range of skills and positions that are commonly found in a large-country department such as the Department of Fisheries and Oceans, Canada or the National Marine Fisheries Service (NMFS) in the USA. Their training and their post-training exposure, frequently lead them to conclude that management cannot be successfully carried out without such levels of input.

In addition to exploring the most appropriate model for fisheries departments of various sizes and with a mandate for various levels of resource value, there is the need to consider the relative capacity that should be established in national and regional institutions. Models of national/regional arrangements that take advantage of limited resources are only now beginning to emerge (Sydnes 2001). This further complicates the matter of national investment in management, because regional institutions must be supported from national funds, usually at the expense of the national institutions. Thus it can be expected that, in addition to collaboration between the two levels, there will be tensions.

The matter of how fisheries departments are run and of accountability bears further exploration. When there is no plan that sets priorities for a period and is reviewed on a regular basis, there is scope for a great deal of ad hoc activity on the part of fisheries department staff. This activity may be opportunity-driven by offers of travel to workshops and training. Travel with associated per diems may increase annual salaries of fisheries officers substantially. Consequently, in the absence of transparent planning, activities that include well-paid travel may get priority.

In small fisheries departments that do not operate according to clear plans that are developed with stakeholders and reviewed regularly, individual agendas may exert a strong influence over the department's priorities. For example, a fisheries officer with strong inclinations to reef conservation may shift the departmental focus in this direction while providing limited attention to offshore fisheries. Formal planning can provide balance and prioritization that can help to overcome these effects.

At the national level, the mechanism for fisheries management planning and decision-making is critical for successful management. The lack of political will to regulate users is a common cause of failure in fisheries management. Fishers inevitably suffer genuine short-term hardship due to regulations, and the political directorate will often favour their short-term needs over the long-term sustainability of the resource. One way to mitigate this may be to formalize the advisory and decision-making process so that fishers inputs are incorporated, long-term versus short-term benefits are documented, and it thus becomes more difficult for the political directorate to ignore the advice.

In summary, the structure and function of developing country fishery departments based on levels of financial support that are appropriate to the value of resources to be managed have not been systematically addressed. Similarly, although the need for improved planning and review processes is frequently identified, there is little to guide managers in these areas. Consequently, systematic action to address these issues has been minimal.

This is an area within which there is great potential for input from the field of organizational change management and public administration, perhaps even considering the applicability of some of the recent thinking on complex adaptive systems and organizational change (Olson and Eoyang 2001). A research programme could be developed to address the areas identified above.

REFERENCES

Aiken, K.A., Kong, G.A., Smikle, S., Mahon, V. and Appledoorn, R. 1999. The queen conch fishery on Pedro Bank Jamaica: Discovery, development, management. Ocean and Coastal Management. 42: 1069-1081.

Arnason,R., Hannesson, R. & Schrank, W.E. 2000. Costs of fisheries management: the cases of Iceland, Norway and Newfoundland. Marine Policy 24: 233-243.

Berkes, F., Mahon, R., McConney, P., Pollnac, R. & Pomeroy, R. 2001. Managing small-scale fisheries: Alternative directions and methods. IDRC, Ottawa, Canada, 308 p.

Chakalall, B., Mahon, R. & McConney, P. 1998. Current issues in fisheries governance in the Caribbean Community (CARICOM). *Marine Policy,* 22: 29-44.

Claro, R., Baisre, J.F., Lindeman, K.C. & Garcia-Arteaga, V. 2001. Cuban Fisheries: historical trends and current status. Pp. 194 – 219 In. Ecology of the Marine Fishes of Cuba. Smithsonian Institution Press, Washington.

Degnbol, P. 2003 "Conflict and Scale: a Defence of Community Approaches in Fisheries Management" *forthcoming* in Wilson, D.C., J.R. Nielsen and P. Degnbol (Eds) The Fisheries Co-management Experience: Accomplishments, Challenges and Prospects Dordrecht, The Netherlands: Kluwer Academic Publishers

FAO. 1993. Marine fishery resources of the Antilles. FAO Fisheries Technical Paper No. 326.

FAO. 2002. Preparation for expansion of domestic fisheries for large pelagic species by CARICOM countries. Large pelagic fisheries in CARICOM countries: assessment of the fisheries and options for management FI: TCP/RLA/0070 Field Document No. 1, 157 pp.

Hara, M. S., Donda & Njaya, F. 2002. "Lessons from Malawi's experience with fisheries co-management initiatives" in Gehab, Kim and M-T Sarch Africa's Inland Fisheries: The Management Challenge Kampala: Fountain Publishers.

Haeuber, Richard. 1996. "Setting the Environmental Policy Agenda: The Case of Ecosystem Management" Natural Resources Journal 36 (Winter): 1-28.

Jentoft, S. 1989. "Fisheries Co-management" Marine Policy 13:137-154.

Magrath, W. 1989. "The Challenge of the Commons: the Allocation of Nonexclusive Resources" World Bank: Environment Department Working Paper #14.

Mahon, R. 1997. Does fisheries science serve the needs of managers of small stocks in developing countries? Can. J. Fish. Aquat. Sci. 54: 2207-2213.

Mahon, R. 2002. Living aquatic resource management. pp. 143-218. In: Natural Resource Management for Sustainable Development in the Caribbean. Edited by I. Goodbody and E. Thomas-Hope. Canoe Press, Jamaica.

Mahon, R. & Boyce, S.L. 1992. CARICOM Fisheries Resource Assessment and Management Program Baseline Survey of Fisheries Division in participating countries. CARICOM Fishery Research Document No. 5: 72 pp.

Jul-Larsen, E., Kolding, J., Overå, R., Raakjær Nielsen, J. & van Zwieten, P.A.M. 2002. Management, co-management or no management? Major dilemmas in southern African freshwater fisheries. Part 1: Synthesis Report, FAO Fisheries Technical Paper 426/1. Rome, 2002. Part 2: Case studies, FAO Fisheries Technical Paper 426/2. Rome.

Malasha, Isaac 2002 "The Outcome of a Co-Managerial Arrangement in an Island Fishery: The Case of Lake Kariba (Zambia) pp 89-106 in Gehab, Kim and M-T Sarch Africa's Inland Fisheries: The Management Challenge Kampala: Fountain Publishers

McCay, B.J. & Jentoft, S. 1998 "Market or Community Failure? Critical Perspectives on Common Property Research" Human Organization 57(1):21-29.

McConney, P.A., Atapattu, A. & Leslie, D. 1998. Organizing fisherfolk in Barbados. Proc. Gulf Carib. Fish. Inst.51: 299-308.

Olson, E. E. & Eoyang, G.H. 2001. Facilitating organization change: lessons from complexity science. Jossey-Bass/Pfieffer, San Francisico, 191 p.

Pinkerton, E. 1989. "Introduction: Attaining Better Fisheries Management through Co-Management - Prospects, Problems and Propositions" Pp. 3-36 in E. Pinkerton (Ed) Cooperative Management of Local Fisheries. Vancouver: University of British Columbia Press.

Pomeroy, R.S. & Carlos, M.B. 1997. "Community-based coastal resource management in the Phillippines: a review and evaluation of programs and projects, 1984-1994" *Marine Policy* 21(5):445-464

Porter, T.M. (1995). Trust in Numbers: the Pursuit of Objectivity in Science and Public Life Princeton: Princeton University Press.

Raakjær Nielsen, J.P.D., Kuperan Viswanathan, K. & Mafuzuddin, A. "Fisheries Co-Management - An Institutional Innovation. Perspectives and Challenges Ahead" Paper no. 216, IIFET 2002 Conference, August 19-22, Wellington, New Zealand.

Ribot, J.C. 2002. Democratic Decentralization of Natural Resources:Institutionalizing Popular Participation Washington DC:World Resources Institute.

Sen, S. & Raakjr-Nielsen, J. 1996. "Fisheries co-management: a comparative analysis" *Marine Policy* 20(5):405-418.

Sydnes, A.K. 2001. Regional Fishery Organizations: how and why organizational diversity matters. Ocean Development & International Law 32: 349-372.

Wilson, D.C. & McCay, B. J. 1998. "How the Participants Talk About Participation in Mid-Atlantic Fisheries Management" Ocean and Coastal Management 41:41-61.

Wilson, D.C., Nielsen, J.R. & Degnbol, P. 2003. (Eds). The Fisheries Co-management Experience: Accomplishments, Challenges and Prospects Dordrecht, The Netherlands: Kluwer Academic Publishers.

Wilson, D.C. 2003. "Conflict and Scale: a Defence of Community Approaches in Fisheries Management" *forthcoming* in Wilson, D.C., J.R. Nielsen and P. Degnbol (Eds) The Fisheries Co-management Experience: Accomplishments, Challenges and Prospects Dordrecht, The Netherlands: Kluwer Academic Publishers.

Wilson, J.A. & Dickie, L.M. 1995. "Parametric Management of Fisheries: An Ecosystem-Social Approach" pp 153-165 in Hanna, S. and M. Munasinghe (Eds) Property Rights in a Social and Ecological Context: Case Studies and Design Applications Washington: The Beijer International Institute of Ecological Economics and the World Bank.

Yaffee, S.L. 1996. Ecosystem Management in Practice: The Importance of Human Institutions. *Ecological Applications* 6(3): 724-727.

4. POLICY OBJECTIVES, LEGAL FRAMEWORKS, INSTITUTIONS AND GOVERNANCE IN SMALL-SCALE FISHERIES

Graeme MacFadyen

SUMMARY

This paper is presented to the FAO Advisory Committee on Fisheries Research (ACFR) Working Party on small-scale fisheries for its consideration. It explores the priority given to small-scale fisheries as reflected in policy objectives set specifically for the sector, the extent to which these objectives are reflected in legislation and perhaps most importantly, the extent to which such objectives and legislation are reflected in management actions. The paper also comments on particular challenges that small-scale fisheries present in adhering to the FAO Code of Conduct for Responsible Fisheries (CCRF). The relative importance given to small-scale fisheries in different countries is further explored by considering the degree to which small-scale fishers are involved in policy formation and management actions, how issues of conflict between small-scale fisheries and other sectors are dealt with, and the extent to which incentives and subsidies are provided to the sector. The paper presents a number of research topics related to these issues that are felt to be of importance.

The paper is based primarily on information collected and analysed from 40 small-scale fisheries practitioners from around the world, in response to a questionnaire prepared and sent to those indicating they would be prepared to complete it. The paper also presents an interesting case study on Sierra Leone, which is especially pertinent to many of the questions raised in the paper and the associated Terms of Reference.

In most countries policy contains conservation/resource, economic, social and equity objectives, with comment on the different methods and strategies to achieve these objectives. Conservation and resource objectives are most commonly generic objectives for the sector as a whole, and not specifically for small-scale fisheries. This is also true of economic objectives, but where these are related to individual sectors, they more commonly refer to industrial rather than to small-scale fisheries. Social and equity objectives pertaining to small-scale fisheries are generally well reflected in policy documents in most countries.

All of these different types of policy objectives generally feed through well into legislation, although the extent of legislation is perhaps greatest for conservation and resource objectives. Economic, social and equity objectives are also generally supported by legislation, but to a lesser extent. Legislation relating to industrial activity, and which benefits small-scale fisheries in support of social and equity objectives, is especially common in the form of legislation relating to bycatch reduction and utilization, as well as to area and seasonal bans for industrial vessels. It may not be appropriate or necessary to reflect all policy objectives in legislation if codified oral rules or traditional management practices are in place, or if policy objectives can be fulfilled through the use of economic instruments.

Experience suggests that in many countries it is in the implementation of policy and legislation that the link between policy, legislation, and management breaks down. Sometimes this is the result of poor monitoring, control, and surveillance, and management failure in general, due to insufficient financial resources, inadequate human capacity development, and/or a lack of adequate integration of policy and management action with non-fisheries sectors. In others it is certainly the result of the low priority given to the sector compared to industrial fisheries. Fisheries have economic, social, technical, cultural, political, biological and ecological components, and these components often lead to conflict. Conflicts may arise between sectors (e.g. small- and large-scale fisheries, or fisheries and other sectors), or between policy objectives. A particular cause of the failure of management action to support small-scale fisheries is that such conflicts are often not dealt with explicitly in the planning process. The failure to plan for such conflicts and to mitigate their impacts, at least as far as is possible, often results either in complete inaction when conflict arises, or means that political influences and power relations come to bear in such situations to ensure that large-scale interests

benefit to the detriment of small-scale fishers. Even if such conflicts are acknowledged at the planning stage, for example through area or seasonal trawl bans to protect small-scale fishing interests, general management failure and power relations may still conspire to adversely impact on small-scale fisheries.

While not a panacea for all these problems, management action to support the interests of small-scale fishers is likely to be more effective where such interests are involved in formal policy formation and decision-making with the government, e.g. through co-management approaches or meaningful involvement of small-scale fisheries' interests in policy development. This can help to ensure that conflicts and trade-offs are explicitly confronted at the planning stage and that their interests are more likely to be represented, but also that small-scale fisheries stakeholders share a greater sense of ownership of policy and are more likely to be aware of it and support necessary management action. However, questionnaire responses provided as part of this study suggest that many countries do in fact have structures or processes in place to involve small-scale fisheries interests in policy formation and the decision-making process. This begs the question as to why management action, even in these countries, does not appear to better support small-scale fisheries. It suggests that political influence and general management failure for the reasons stated above may be at least as important in causing poor management as a lack of involvement of small-scale fishers in policy formation and decision-making.

Many countries provide subsidies to small-scale fisheries, most commonly in the form of import-tax exemptions and provision of credit on favourable terms. However, while some studies have been completed on subsidies in small-scale fisheries, knowledge of the extent of their use, their costs and benefits, which types are most commonly used, and the potential impacts of removing them remains extremely thin. There is also little research done prior to the introduction of subsidies to justify their use through the quantification of their costs and benefits.

Taking into account the above, a number of other areas of future research are also suggested. Perhaps most importantly is the need to consider how small-scale fishers can be more effectively brought into the policy formation and decision-making process, but also the extent to which such involvement is likely to result in policy, legislation and management action that support their interests. Greater involvement should result in wider recognition of the potential trade-offs and conflicts between sectors and policy objectives, and dealing with such conflicts at the planning stage is considered important for effective management and reduced user conflict. However, the potential implications of trade-offs between objectives, particularly in terms of their distributional impacts/benefits remains to be better explored and clarified.

Involvement of small-scale fishers in policy formation and decision-making is itself unlikely to solve all the current management problems adversely impacting on small-scale fisheries. Human capacity building at all levels to ensure good fisheries governance is also a pre-requisite, and further research is required into the most effective methods of developing such capacity. Other important areas of research include reasons for the failures (and successes) in the policy/legislation/management linkage, and effective economic instruments that could be used to support better fisheries management.

1. INTRODUCTION

1.1 Background

This paper is presented[1] to the Advisory Committee on Fisheries Research (ACFR) Working Party on small-scale fisheries for its consideration. The paper focuses specifically on policy objectives, legal frameworks, institutions and governance in small-scale fisheries. The paper is based primarily on:

- Comments provided by around 40 small-scale fisheries practitioners (from a wide range of countries and areas, providing good geographical coverage) to a questionnaire prepared by the consultant.[2] The terms of reference and the questionnaire used for the study are given in Appendix A and B respectively.
- A Case Study of Sierra Leone (see section 3), based on work previously completed by the consultant (Macfadyen, 2000).
- Comments made by FAO staff and by Oscar Amarasinghe[3] to initial drafts of the paper.

1.2 Explanation of terms

The wide variety of fishing operations employed in "**small-scale fisheries**" means that no single definition can be universally applied, and individual countries tend to focus on different attributes to distinguish between small-scale and large-scale fisheries. However, a recent paper[4] presented at the Twenty-Fifth session of the Committee on Fisheries (COFI 25) states that "small-scale fisheries can be broadly characterized as employing labour-intensive harvesting, processing and distribution technologies to exploit marine and inland water fishery resources. The activities of this subsector, conducted full-time or part-time, or just seasonally, are often targeted to supplying fish and fishery products to local and domestic markets, and for subsistence consumption. Export-oriented production, however, has increased in many small-scale fisheries during the last one to two decades because of greater market integration and globalization. While typically men are engaged in fishing and women in fish processing and marketing, women are also known to engage in near shore harvesting activities and men are known to engage in fish marketing and distribution. Other ancillary activities such as netmaking, boatbuilding, engine repair and maintenance, etc. can provide additional fishery-related employment and income opportunities in marine and inland fishing communities.

Small-scale fisheries operate at widely differing organizational levels ranging from self-employed single operators through informal micro-enterprises to formal sector businesses. This subsector, therefore, is not homogenous within and across countries and regions, and attention to this fact is warranted when formulating strategies and policies for enhancing its contribution to food security and poverty alleviation.

Fisheries **policy** sets out objectives, and (at least theoretically) guides actions and decisions relating to the sector to implement what are often (but not necessarily) long-term strategic goals/objectives. A key part of this paper is to assess the extent to which policy objectives are reflected in legislation and actually guide management actions.

Legislation embraces all instruments having the force of law, such as Acts, Regulations, Decrees, Ordinance, and Orders. It provides the legal framework to support fisheries policy through the detail specified in such instruments, and through powers relating to enforcement and sanctions for those infringing the law.

Institutions are often equated with organizations, but they should not be. "In general, institutions, whether organizations or not, are complexes of norms and behaviours that persist over time by serving collectively-valued purposes" (Uphoff, 1986). Small-scale fisheries are those at regional, national, and local levels having some bearing and involvement in policy formation, implementation of fisheries management and the law, exploitation of the resource etc. They may include organizations and groups such as government agencies and representatives, community organizations, fishers, and research groups, but also other norms and behaviours related to small-scale fisheries.

---

[1] Paper prepared by Graeme Macfadyen. (graeme@consult-poseidon.com).

[2] The questionnaire was sent to small-scale fisheries experts, representatives of Regional Fisheries Organizations (RFOs) and contacts known to the consultant, and to those indicating their willingness to complete it following requests made through a number of email distribution lists on behalf of the consultant.

[3] Senior Lecturer, Faculty of Agriculture, University of Ruhuna, Mapalana, Kamburupitiya, Sri Lanka.

[4] "Strategies for increasing the contribution of small-scale capture fisheries to food security and poverty alleviation" (COFI/2003/9) http://www.fao.org/docrep/meeting/005/Y8111E.htm.

Likewise, **governance** is often incorrectly equated with management undertaken by government. In fact, the term is intended to make people stop and think about non-governmental roles in fora where the word "management" is too often taken to refer to purely governmental action (Adams, 1996). Governance relates to government, civil society and the private sector. Under most of the definitions recently put forward, good governance is used to describe a particular philosophy of management that is not purely "top-down", but which emphasizes "community" and, like all good management approaches, makes extensive use of dialogue and mutual agreement before taking action. For the purpose of this document, fisheries governance is defined as "a continuing process through which governments, institutions and stakeholders of the fishery sector – administrators, politicians, fishers and those in affiliated sectors – elaborate, adopt and implement appropriate policies, plans and management strategies to ensure resources are utilized in a sustainable and responsible manner. It could be at a global, regional, sub-regional, national, or local level. In the process, conflicting or diverse interests may be accommodated and cooperative action may be taken." (Swan/FAO, 2000). The characteristics of good governance include it being: responsive, participatory, transparent, equitable, accountable, consensus-orientated, effective, and efficient.

2. DISCUSSION AND KEY FINDINGS

2.1 To what extent are specific policy objectives defined for small-scale fisheries

This section considers the extent to which a number of policy objectives in fisheries policy documents are defined for small-scale fisheries. An important determinant of the extent to which small-scale fisheries objectives are contained within policy documents, is likely to be the extent to which small-scale fishers are involved in the policy process itself (see also Section 3).[5] As demonstrated in the Sierra Leone case study in Section 3, in some countries there is no formal process for the creation of fisheries policy and who should be involved, although in many cases policy is re-defined every five years. A compounding problem is that there is frequently either a lack of good research on small-scale fisheries on which policy can be based, or, the link between researchers and policy-makers is not sufficiently well-maintained to ensure that the findings of research are used to inform policy. Furthermore, in many countries there is a lack of any "long-term vision" in respect of fisheries policy, with policy documents confined to "short-term development plans" rather than to national fisheries policies dealing with long-term objectives, whether for small-scale fisheries or other sectors/groups.

Nevertheless, the headline objectives, and some typical[6] related "sub-objectives" or tools to achieve these objectives that can be found in policy documents are presented below in Table 1.

Table 1: Policy objectives and related tools

Optimal and sustainable use of resources	• rational exploitation of resources • provision of access rights (and restrictions) • appropriate/good data collection • management of ecosystems • compliance with international conventions • effective MCS
Economic objectives	• increasing value-added • promoting export earnings • improved marketing arrangements • technological provision and modernization of fishing methods • credit provision

---

[5] The FAO-supported Train-Sea-Coast material provides some useful information on how such processes might be formalized, and indeed emphasizes the two distinct issues of: (a) the policy formation process; and (b) the content of the policy itself.

[6] This list is not intended to be exhaustive

	• provision of subsidies • maximizing resource rent being collected by government • economic diversification • increasing incomes for rural fishing populations • exploitation of underutilized resources
Social objectives	• maximizing employment • ensuring food security • participation in the fishery by local people • support for fishing organizations • capacity development and education
Equity objectives	• provision of access in certain areas or at certain times for certain groups (e.g. small-scale fishers, locals vs. foreigners) • support for customary rights • utilization/landing of bycatch • issues relating to gender

In many countries fisheries are predominantly small-scale in nature. In such situations one might presume that all policy statements relate primarily to small-scale fisheries. This is sometimes the case, especially in landlocked countries with few industrial fishing possibilities, and policy documents then make statements on all objectives that relate to small-scale fisheries, both implicitly and explicitly. However, in many countries where fisheries are predominantly small-scale in nature, policy documents may still contain many objectives for industrial fisheries, for example related to joint ventures, access agreements, or development of such fishing methods, because of the perceived financial benefits of such activities.

However, policy statements relating to optimal and sustainable use of resources are in many, but not all policy documents (see Table 1) just general statements that do not relate specifically to small-scale fisheries but to the sector as a whole, unless specific fisheries are mentioned and these are small-scale in nature. Furthermore, with the exception of some policy documents, e.g. Philippines, Bangladesh, Mali, Papua New Guinea[7], fisheries policy often contains no objectives relating to ecosystems-based approaches to management, and focuses more on traditional ideas of sustainable exploitation of fisheries. This is hardly surprising given that ecosystem-based approaches are relatively new, but mean that even when the concepts are well known, ecosystem-based management often remains a "research issue" rather than an instrument of management.

Policy statements relating to economic objectives are also often found to be general statements about contributions to gross domestic product, increasing export earnings, etc., and less frequently to specific objectives relating to small-scale fisheries. Indeed economic objectives are more often specified for industrial fisheries. Economic objectives in small-scale fisheries are however sometimes dealt with specifically, for example, in terms of utilizing artisanal fisheries to alleviate poverty in coastal communities (Congo) and in relation to financing/modernization of artisanal fisheries (Senegal). Economic policy objectives for industrial and small-scale fisheries may contradict each other, leading to conflicts among resource users, as discussed further.

For many countries there are indeed a wide range of well-defined social and equity objectives related to small-scale fisheries, e.g. Burkina Faso, Congo, Oman, Senegal, Mali, Bangladesh, Tanzania, Papua New Guinea, Philippines, Cameroon, West Indies, and Uganda, either explicitly, or in so far as statements relating to social and equity issues can be assumed to imply a benefit or impact on small-scale fisheries and coastal communities. However, these objectives tend to relate to the aspects listed in Table 1 above. Less well covered in policy are aspects relating to the working conditions of fishing labour, with labour law generally not thought applicable, or not enforced, in the fishing sector in many countries.

---

[7] These examples are not intended to imply that such statements only occur in policy documents in developing countries, but are examples drawn from the questionnaire responses. In fact it is likely that policy objectives relating to ecosystem-based management are especially prevalent in developed countries.

Finally, it should be noted that in many countries there are policy documents from other sectors that also relate to small-scale fisheries. For example, policies relating to public sector reform and decentralization may be supportive of co-management and devolution of policy formation and management responsibilities to small-scale fisheries communities. Likewise, environmental or water legislation in many countries may support the sustainability of fish stocks, while Poverty Reduction Strategy Papers (PRSPs) may include reference to small-scale fisheries, poverty reduction in coastal communities and commitments to gender and equity issues. Trade policies may affect the ability of small-scale fisheries to export fisheries products. The impact of such policies on the fisheries sector remains to be investigated through further research, along with effective methods of influencing such policy to support small-scale fisheries objectives.

2.2 The extent to which policy objectives are reflected in legislation

In many cases legislation provides a crucial mechanism for incorporating policy objectives into a legal framework to allow for sanctions and penalties in small-scale, semi-industrial and industrial fisheries. The legislation is part of the linkage between policy, through the legal framework, and into management action that may be important for all objectives. Table 2 presents a schematic for the types of headings/issues commonly dealt with in fisheries legislation, relating to different policy objectives.

Table 2: Summary table of issues commonly covered in legislation to reflect certain policy objectives

Optimal and sustainable use of resources (1)	**Economic objectives (2)**	**Social objectives (3)**	**Equity objectives (4)**
• Registration of fishers. • Allocation of rights, licences, permits etc, and their removal. • Scientific and research activities. • Management and planning processes. • Management and advisory bodies and their powers. • Conservation and management measures based on definitions of allowable gear-use and fishing practices. • MCS powers and penalties/sanctions. • Bycatch reduction and utilization. • Requirements for data collection/catch reporting. • Definition of EEZ, territorial sea and contiguous zone.	• Promotion of the industry. • Control of foreign activities. • Collection of licence/permit fees, royalties, etc. • Licensing of processing establishments. • Licensing of exporters and related requirements. • Economic data collection requirements. • Bycatch reduction and utilization.	• Bycatch utilization. • Inshore fisheries management. • Safety requirements. • Control of foreign activities. • Local ownership of companies, or preferential access, or reduced access, fees for/by national enterprises.	• Management measures e.g. seasonal or area restrictions, especially with regard to industrial/foreign activity.

Legislation in many countries is perhaps most strongly focused on reflecting objectives related to management of the resource (i.e. objective 1 in the table above). Legislation is especially prevalent with regard to ensuring sustainable use of resources through the provision and restriction of access rights. Much of this legislation pertaining to sustainable resource management objectives directly relates to small-scale fisheries in that they are referred to in terms of licence and registration requirements, management of small-scale resources etc.[8]

However, this is not to say that other objectives are not covered in legislation or associated regulations; rather that as one moves right across the table above, the objectives are perhaps less well supported by related legislation. There is also a considerable amount of legislation relating to economic, social and equity objectives and/or reflection of objectives specific to small-scale fisheries – bycatch utilization is an example, where legislation is used to ensure landings of incidental catches. Utilization of bycatch often takes place by small-scale fishers to add value and supply local marketing/processing chains, and can be important for food security. Legislation in place in many countries to specify proportions of bycatch which must be landed, or amounts of finfish landings as part of shrimp trawl operations, are therefore of significant benefit to small-scale fishers and coastal communities and reflect both social and economic objectives.

Because some objectives of policy may contradict others, and as already noted such conflicts are seldom explicity stated or explored, these contradictions can feed through into contradictory legislation. For example, legislation to stimulate greater participation of the private sector in freshwater fisheries may contradict with the recognition of customary rights of community members.

Legislation pertaining to industrial fisheries may also have a significant benefit on small-scale fisheries. As reported in a recent study (Poseidon/FAO, 2003 currently in press), legislation and programmes for bycatch[9] reduction are common in both developed and developing countries, and in temperate and tropical fisheries. In developed countries, programmes are particularly advanced in Norway, North America, New Zealand, and Australia. In developing countries, programmes focus largely on shrimp and tuna/billfish bycatch reduction devices, to reduce turtle, seabird, finfish, and marine mammal bycatches. Developing and middle-income countries (*inter alia*, Indonesia, Qatar, Philippines, Thailand, Bahrain, Iran, Kuwait, India) are shown to make extensive use of area and seasonal closures to reduce finfish bycatch from shrimp trawlers. This legislation, primarily in support of a policy objective of optimal and sustainable use of resources, is focussed almost exclusively on semi-industrial and industrial fisheries, although may of course have a significant bearing on ensuring social objectives for small-scale fisheries, given competition for inshore resources between industrial and small-scale fisheries sectors in many countries.

The above discussion raises the question why, and to what extent, policy objectives should be reflected in legislation?

Many policies may not need to be hardwired into legislation, particularly for small-scale and traditional fisheries, if for example objectives are reflected in codified oral rules, within a village council framework, or in heterogeneous bylaws, or if they can be achieved through other means. There may be no need to legislate for some objectives if they can be achieved through economic instruments, support/promotion and ad hoc programmes that do not require enforcement by the rule of law. While it is certainly the case that some policy objectives for small-scale fisheries could/should be better reflected and supported through fisheries legislation, it is not necessarily appropriate to see all policy objectives reflected in law. A possible research topic of benefit would be to investigate which policy objectives should be and are best dealt with through formal legislation, which through informal/traditional management, and which through incentives and other measures/stimuli.

A related issue (reflecting the impact of policies in other sectors on small-scale fisheries) is the extent to which legislation affecting small-scale fisheries should be, and is contained in "fisheries law", as opposed to in other legislation. For example, community participation in coastal resources management in Sri Lanka is often dealt with in coastal conservation legislation rather than in fisheries legislation. The Coast Conservation Act, 1981 makes provisions for the identification of special coastal areas needing management and the establishment of management committees with the participation of all stakeholders, including fishers.

---

[8] Fisheries legislation is now much more diverse that it was historically. In the past, legislation in many countries concentrated mainly on collecting taxes, both from inland and marine fisheries. This was especially true of colonies and applied to colonial administrations at both national and regional levels.

[9] Discarded catch plus incidental catch.

2.3 The extent to which policy objectives actually guide management actions

Policy objectives are said to guide management actions in many countries and they are. It is also far easier to specify policy objectives on paper in a fisheries policy document, and to legislate for them, than to enforce fisheries laws and take appropriate management actions in the real world. There are a number of reasons for the failure of many countries to ensure that policy objectives are reflected in management actions. Some of the problems are generic to many countries, while others are specific to particular cases. Some of the most important/common causes of problems are listed below:

- Insufficient financial resources and inadequate requisite human capacity and institutional strength for MCS, management, and research. This is often reflective of: (a) the low importance given in many countries to the fisheries sector compared to other sectors; and (b) the failure to collect sufficient resource rent from the fishery.
- Poor cross-sectoral integration in policy and management with other sectors[10].
- Political interference with fisheries management actions from those outside the fisheries sector, but who are in positions of influence/power.
- Difficulty of managing large numbers of small-scale fishermen, especially when: (a) there is a lack of awareness by small-scale fishers of policies and management requirements; and (b) many fishers are living in conditions of relative poverty with the result that pressure on resources remains high. Motivations to comply with management measures are also hampered where there is a lack of small-scale fishers' involvement in the policy process.
- Emphasis by politicians/managers on supporting/managing the industrial sector because of the relative ease of collecting resource rents compared to the small-scale fisheries sector, and the low status accorded to small-scale fisheries in many countries compared to industrial fisheries.
- Concern by civil servants about really devolving power through co-management approaches, and the difficulty of doing so in the face of weak small-scale fisheries organizations. Stronger fisheries organizations involved in management could also help to minimize management costs. However, many existing fisher organizations give low priority to management measures relative to welfare measures. Moreover, fisheries cooperatives, the most pervasive type of fisher organization, are primarily concerned with savings schemes, loans, handling state subsidies etc. These attributes mean that the ability to effectively engage existing organizations in management issues remains uncertain, and is an area worthy of further research.
- Policy objectives such as sustainable exploitation not being acted on because of other more over-riding considerations (e.g. welfare, food security and/or food self-sufficiency) being taken as justification to deviate from stated policy goals. This is reflective of the problem of lack of action on some policy objectives because of conflict with others. For example, government may not take any firm action against those engaged in coral mining, using inappropriate gear, felling mangroves for house building, etc. because of the knowledge that such people are the "poorest of the poor", and are engaged in such activities to provide an essential means to earn a living.
- Managers concerned with issuing licences to generate revenue.
- Problems of identifying who is a "fishermen" and therefore subject to management action, given the part-time nature of much fishing activity.

---

[10] A good example is legislation in respect of the management of inland water bodies. Fisheries legislation on inland water bodies often cannot be put into action without concern for other legislation which guides the behaviour of other stakeholders, such as farmers using such water bodies to irrigate their lands. Likewise, weak enforcement of trade/export laws can have a significant impact on fisheries by creating an incentive to over-exploit resources for short-term market gains.

In considering the extent to which policy objectives are reflected in management action, one should not forget the role of informal policy objectives i.e. those not written down and formalized in policy documents, but which nevertheless guide management actions and enforcement of legislation. These may be the informal policy objectives of government at national or local level, or of fishers themselves or other groups in civil society. These informal policy objectives may be as important as formalized policy statements in guiding management actions, may be more adaptable to changing circumstances (and influences), and may not be revealed in formal fisheries policy documents. A related area of research of interest would be the extent to which formal and informal policy objectives agree/differ, if they differ why, and which have the greater impact on guiding management actions.

It would, however, be wrong to give the general impression that in all countries' policy objectives are never reflected in management actions. As described above, legislation does often reflect policy objectives (even if to varying degrees in different countries), and there is obviously not a total lack of enforcement of the law in all countries. Indeed in many countries enforcement of a multitude of different types of management regulations in support of policy objectives (e.g. closed seasons, areas, mesh sizes, etc) can be said to be good. Certainly it is the case that there are success stories in fisheries management, and there are many small-scale fisheries that have succeeded in supporting many fishers and related processing and marketing activities over long periods of time, with significant resulting economic and social benefits. What would certainly be interesting would be research into the extent to which such small-scale fisheries have managed to continue to generate benefits and be successful, because of specific policy objectives feeding through into related management actions, in spite of policy, or for other reasons not related specifically to policy (e.g. environmental changes, market factors, isolation, luck, etc) i.e. to what extent are clearly defined policy objectives and their reflection in management action a pre-requisite for success. Research on the key reasons for the success or failure of carrying policy objectives through to management action would also be useful.

2.4 The extent to which small-scale fishers are involved in policy formation and decision-making

The first question addressed in this paper in Section 1 ("to what extent are policy objectives defined for small-scale fisheries"), begs the question as to whose policy objectives they are? - the government's, the fishers', the village leadership, regional fishery management organizations etc? There is a tendency to assume that definition of policy objectives and formation of policy only takes place at a national/government level. However, there are many different stakeholders in fisheries and they often have different objectives. The extent to which formal government policy documents lay out the objectives of other stakeholders largely depends on the extent to which such stakeholders are involved in the formal policy formation process. Small-scale fishers may also be involved in the formation of their own informal policy and decision-making processes that may have little involvement with government. Equally, co-management approaches, to differing degrees, may closely involve small-scale fisheries interests in formal/written policy formation, as well as in informal policy decision-making.

Experience shows that a surprisingly large number of countries e.g. Albania, Cameroon, Canada/US, Congo, Malawi, Mauritania, Nigeria, South Africa, Morocco, Oman, Poland, Philippines, Papua New Guinea, Russia, either have institutions/structures in place to involve small-scale fishers in the formal policy formation and decision-making process, or informally seek the involvement of small-scale fisheries' interests. There is also extensive involvement of small-scale fishers in policy formation and management action in Japan in the form of co-management and community-based management. In addition, a number of the members of the Fisheries Policy Council established under Japanese fisheries law represent coastal small-scale fisheries' interests.

In other countries, e.g. Bangladesh, Barbados, there is no mechanism for such involvement. The failure to involve small-scale fisheries interests may be especially prevalent in countries where policy is defined (following only brief consultation with small-scale fisheries stakeholders) by high-level policy committees and/or with assistance from short-term donor-assisted policy experts who have insufficient time or mandate to undertake adequate consultation. Failure to involve small-scale fishers may also be the result of:

- Weak institutional representation at the small-scale fisheries level.
- The inability of policy makers to decide who to consult given large numbers of stakeholders with wide ranges of interests.
- Low levels of educational status in fishing communities, coupled with modern-day concepts involving sophisticated terminology such as biodiversity, ecosystem-based management, precautionary approach to fisheries decision making, globalization, etc. The terminology used by scientists, researchers and top level state officials is often not easily comprehensible to ordinary fisher folk without careful explanation and facilitation, requiring time and expertise.
- A lack of political will.[11] This lack of willingness to include small-scale fishers in the policy process may stem from a number of causes including:
    - i) greater political support for industrial fishing because of the ability of the sector to earn high levels of foreign exchange;
    - ii) political support to those in power provided by industrial fishing interests;
    - iii) an often hostile reaction by small-scale fishers to government officials and politicians, due to the pervasiveness of poverty, poor infrastructural facilities, and the perceived privileged treatment of industrial fisheries interests.

However, the extent to which small-scale fisheries interests are involved in policy formation may also be as much a result of physical geography and numbers of people, as of political will, and the importance of the size (geographical and population) of countries should not be under-estimated. In some small island countries e.g. in the Pacific, the low population levels and concentration of people on particular islands means that even upper-levels of Government are often close to the ordinary people. Conversely, in large countries with significant small-scale fisheries' populations, consultation and involvement of small-scale fishers is often hampered by large geographical distances to be covered (with time, logistical and cost implications) and the inability of small-scale fisheries to effectively organize into fora which can feed their views into the policy process – this is especially so when decision-making takes place in capital cities many miles away from where small-scale fishers live.

The above discussion centres on whether small-scale fishers either are, or are not, involved in the policy formation process. However, even in cases where small-scale fisheries stakeholders are involved in the process, it is not clear the extent to which this participation actually impacts on finalized policy content in official documents to reflect the needs and priorities of small-scale fisheries. This is an area of potential research, as there may well be a mis-match between the objectives of small-scale fisheries and official government policy even if small-scale fisheries' interests have been involved in the policy process. There is a significant difference between real participation and just consultation/token involvement, and it is suspected that in many countries in which small-scale fisheries are involved in the policy formation process it is more based on consultation, than real participation.

As noted, management measures are more likely to be successful if small-scale fisheries interests are involved in the policy formation process. A crucial issue for small-scale fisheries is therefore how to integrate their activities into fishery policy process and management plans where these exist or are being developed. For fisheries management to work, all current and potential exploiters must be included in the system. The challenge is therefore to design holistic management plans (but not necessarily ones which deal with small-scale fisheries as a discrete sector) that give small-scale fisheries a realistic chance of success. There may be many ways to achieve this, but it remains a researchable issue. It is demonstrated that stakeholder involvement itself generates no guarantees that management action will actually reflect policy objectives and management plans, given other influencing factors, hence the importance of ensuring the linkages between policy, legislation and management action.

---

[11] In Sri Lanka for example, the National Fisheries Solidarity, a fisheries non-governmental organization (NGO), recently appointed a three-member Fisheries Commission to prepare a National Fisheries Policy paper (to be presented to the government) by obtaining information from diverse fisher groups in the country. With the help of a number of NGOs operating in the country the members of the commission travelled extensively meeting various fisher groups to obtain information on the problems associated with small-scale fisheries (their nature, causes, etc.) and solutions suggested by fishers themselves. This facilitated the preparation of a fisheries policy paper that aimed to draw attention by the government to the needs of the small-scale fishers. However, political will was absent in the Sri Lankan case and the government did not want to discuss the contents of the policy paper prepared by the Fisheries Commission. (Amarasinghe, O. Pers. Comm.).

3. SIERRA LEONE CASE STUDY

In 2000, Poseidon Aquatic Resource Management Ltd (Poseidon) staff completed a report on legislation in Sierra Leone (Macfadyen, 2000) as part of a larger project report in response to an agreement by the Department of Fisheries and Marine Resources (DFMR) of the Ministry of Agriculture, Forestry and Marine Resources, and the National Authorising Office of the Delegation of the European Commission in Sierra Leone, for support to the development of a fisheries sector strategy in Sierra Leone. The report provides an interesting case study of special relevance to many of the questions raised in this paper, and specifically on the extent to which linkages between policy objectives, legislation and implementation are often broken in the real-world in which fisheries management actions take place. The text below provides a summary of the main findings based on the consultant's report[12].

3.1 Policy

In 1994, a Marine Policy Advisory Committee was formed to advise on policy formulation primarily aimed at:

enhancing a high degree of efficiency in the management of resources (i.e. both a resource management objective and an economic objective); and

advising on ways to improve and increase active participation of indigenous Sierra Leoneans in the fishing industry (i.e. social and equity objectives).

The Policy Committee made a variety of detailed recommendations relating to these objectives, and to ways of increasing fishing revenues to the Government. However, it was not thought that the recommendations were ever adopted as official policy and published as such. As a result, no clear policy framework existed for the fisheries sector, and the consultant was not able to obtain from any staff in the DFMR a copy of fisheries policy. The view was widely held in the DFMR that effective fisheries policy equated to the yearly budgetary requests and programming for Department activities.

Furthermore, there is no specified process for policy development in Sierra Leone. The Fisheries (Management and Development) Act, 1994 makes no reference to how policy should be developed or who should be involved, although it does specify that the Secretary of State should develop such policy. The lack of any specified mechanism for formulating and reviewing policy has created confusion for management and development of the sector.

3.2 Legislation

Legislation is focussed most strongly on conservation and resource management objectives, although action is also described in the Act to protect and promote artisanal and semi-industrial fisheries i.e. social objectives. Bottom trawling by industrial and semi-industrial vessels is prohibited in waters of less than 15 m, i.e. an equity objective. The Act also requires all reasonable measures to be taken outside the Inshore Exclusion Zone (IEZ) to avoid gear conflict and provision is made for closed seasons and marine reserves. Fisheries Regulations also reflect economic objectives of revenue generation through the specification of licences and related fees for the catching, marketing and processing sectors.

In general, the Fisheries (Management and Development) Act of 1994 is well drafted and contains most of the necessary provisions required to conduct effective fisheries management and to control fishing-related activities. Some changes were, however, recommended in the consultant's report and related to:

---

[12] Please note, document not officially released for political reasons and therefore not to be quoted from or referenced without permission.

- anomalies and poor definitions in the Act;
- changes in other related legislation in Sierra Leone;
- developments in international fisheries management that should be reflected in Sierra Leone's fisheries laws (e.g. the FAO Compliance Agreement); and
- more detailed specification of institutional structures.

It was widely stated in Sierra Leone during the consultant's visit that the current Regulations were those of 1995, and the consultant was furnished with a copy of these "regulations" on request for the current law. The DFMR was working from and implementing these "regulations" where possible. However, they had never been Gazetted or laid before Parliament and were not therefore law. The reasons for this were not clear[13], but the result was that the Regulations of 1990 were in fact the current law at the time.

Sierra Leone revised its laws to comply with the provisions of the United Nations Convention on the Law of the Sea (the Convention) with the passing of the Maritime Zones (Establishment) Act, 1996. Provisions in the Act relating to the territorial sea, contiguous zone, exclusive economic zone and continental shelf, are fully consistent with the provisions of the Convention. However, no baseline survey has been conducted, and no charts and geographical co-ordinates have been given due publicity and deposited with the Secretary General of the United Nations, as required in the Convention. Sierra Leone has no maritime boundary delimitation agreements with either Liberia or Guinea.

The point was made earlier in this paper about the importance of non-fisheries specific legislation in affecting small-scale fisheries. In Sierra Leone, the consultant found that there were at least ten other pieces of legislation that had a significant bearing on small-scale fisheries.

3.3 Management action

While Parliamentary Committees are periodically established to inform on policy, it appears that the findings of such Committees rarely get formally approved and passed down from the Minister to the Director of the DFMR as a basis for guiding management.

Of equal concern to the consultant was the large number of provisions in the Act (some required and some just provided for) that were not being followed, utilized or acted upon. Virtually no active resource management or planning of the fisheries sector was taking place. The Act specifies that important fisheries should be defined as "designated fisheries" with associated management plans developed, but no fisheries had been designated as such, and no management plans had ever been developed.

As mentioned above, a lack of regard for fisheries legislation was demonstrated by the fact that the DFMR was implementing regulations that had never been Gazetted or laid before Parliament, and which were not therefore law. The DMMR was also charging licence fees that had not been formally constituted in law. The linkage between the state of the resource and the licence fees charged to foreign industrial fishing was either not well understood or of no great concern, and government was more worried about charging what it could for licences and not making management measures so strict that they encouraged foreign vessels to fish in neighbouring countries. Because there is no local industrial fishery the departure of foreign vessels would be a disaster for the government in terms of revenue generation from marine resources, one of the country's most valuable natural assets.

A large number of infractions of the law by industrial vessels were taking place that were either undetected, or when they were identified were not being followed up through prosecution or the imposition of penalties. Anecdotally some of these infractions were said to be having a considerable impact on small-scale fisheries. Particularly common infractions included:

- transhipment without the required authorisation or supervision
- fishing within the Inshore Exclusive Zone (IEZ)

---

[13] The relationship between the DFMR and the Law Officers Department did not appear to be a good one and may, at least in part, explain why the 1995 regulations were never finally agreed and Gazetted.

- failure to have an observer on board
- failure to allow an observer to carry out his duties
- use of illegal mesh sizes
- failure to fulfil local landing obligations
- failure to supply requested information

Institutional structures were not proving effective in developing and acting on management decisions. The institutional capacity of the DFMR was severely limited due to financial constraints and the exodus of many skilled personnel from Sierra Leone during political troubles in the country. The consultant report identified an urgent need for long-term donor support for institutional strengthening and training in almost all disciplines and functions conducted by the DFMR.

3.4 Stakeholder involvement

Involvement of small-scale stakeholders in policy and management at the national level was virtually non-existent. The lack of involvement in policy was reflective of the lack of any formally specified process for policy development which included small-scale fishers.

A Scientific and Technical Committee (STC) was constituted to provide management advice to the Director of the DFMR, but the composition of the STC is not prescribed in legislation, and contained no representation from other than the industrial or the artisanal sector. A framework for the development of fisheries management plans is provided for in legislation, and the Director is required to consult with, among other parties, "local fishermen, local authorities and other persons", as well as other states in relation to shared stocks. However, as mentioned above, no such plans have ever been developed.

At the local level, neither traditional fisheries management techniques nor customary fisheries tenure are common in Sierra Leone. However, the system of traditional government and local courts offers potential for small stakeholders to be involved in the establishment and enforcement of management decisions at the local level.

4. HOW ARE ISSUES OF CONFLICT DEALT WITH IN PLANNING, AND WHAT PRIORITY IS GIVEN TO SMALL-SCALE FISHERIES?

4.1 Types of conflicts

Fisheries have economic, social, cultural, technical, political, biological and ecological components, and the presence of such an array of components can often lead to conflicts. The scope of fishery governance may encompass one, some, or all of these categories, and except in the rare situations where marine ecosystems are relatively untouched, will be forced to deal either directly or indirectly with the trade-offs between them (Hanna, 1998). Issues of conflict in planning and development of policy, and subsequent management, can take the form of conflicts between: (a) sectors (e.g. large and small-scale fishers, or between fisheries and other sectors); and (b) objectives (sustainability, economic, social, equity etc), which may themselves be supporting sectors to different degrees.

There are so many unknown (and, in view of the limited resources available for researching them, unknowable) issues in fisheries that it is extremely difficult, if not impossible, to plan the perfect management system. Only a framework or a basic toolbox can be planned, allowing for adjustments to be made in reaction to the behaviour of the system under real-life operating conditions. However, explicitly recognizing and confronting trade-offs and conflicts at the planning/policy stage is a key first step towards successful management both in terms of making it more likely that management will be successful, and also in helping to define what constitutes "success" i.e. is the aim to primarily achieve a sustainability, economic or social objective, or some relative balance between them and any other objectives.

Some types of contradictions[14] and trade-offs in objectives that need to be considered through transparent decision-making mechanisms at the planning stage, might include:

(i) ***An increase in equity for a decrease in efficiency***. At the level of the individual vessel operator, changing the balance in the factors of production in favour of labour over capital inputs might result in greater employment but reduced profitability, although some studies suggest that because labour is relatively cheap in many small-scale fisheries, substituting labour for capital inputs (which tend to be expensive) can increase both profitability and equity. At the macro level, some management regimes may directly trade efficiency against equity, e.g. open access or community-based management rather than systems of private property.

(ii) ***Supporting exports versus production for the national market***. Increased exports to increase revenues in small-scale fisheries and enhanced foreign exchange earnings may lead to a decrease in availability of fish for sale in local markets. Such a trade-off may have important effects on the distribution of poverty and food security.

(iii) ***Supporting foreign or local fisheries for enhanced national income.*** A government may obtain licence revenue or royalty payments from foreign industrial fishing companies, or encourage export earnings from its own semi-industrial or industrial fleet. Both policies may result in small-scale fisheries catching less fish, thereby decreasing their contribution to food security and poverty alleviation. However, this may be viewed as acceptable if it increases revenue for food imports and national poverty-reduction programmes. Again, important distributional effects in food security and income may result from such trade-offs.

(iv) ***Short-term and long-term interests.*** Short-term initiatives to reduce poverty and improve food security may have a negative impact on long-term sustainability. Small-scale fisheries might be supported through credit provision or subsidies in an attempt to increase food security and earnings, but could result in overexploitation, falling catches and declining profitability.

In addition to the trade-offs between policy objectives, there is the risk of unintended effects from certain policies or changing management regimes. Disbanding commercial or powerful fishing monopolies to improve access of small-scale fishers to fishing grounds may actually remove a form of "management" of a water body, leading to conflicts between small-scale fishers and possibly even overfishing. Habitat restoration, rehabilitation and conservation should have positive benefits on living aquatic resources, but such efforts may affect small-scale fishers by temporarily denying them access to resources, or by encouraging large-scale fishing interests to exploit the improved habitat. Therefore, even after policy choices and trade-offs have been considered and decided upon, there is a need to continuously monitor their impact on poverty and food security, and modify them as necessary.

The trade-offs discussed above are examples of conflicts between policy objectives. Of equal importance are two main types of conflict at the sector level. Firstly, conflict within the fishing sector between different fishing gears and interests. Secondly, conflict between fishers and those operating in other sectors.

In terms of fisheries and other sectors, conflict is perhaps most common over land use, and to a lesser extent, access to inshore coastal waters. Such resources in coastal zones are often in high demand by fishers, tourism, and for other uses and forms of development, and require careful management and planning if conflict is to be avoided.

Within fisheries, conflicts arise not only most obviously between industrial and small-scale fisheries interests, but also among different small-scale gear users exploiting the same resource: for example, beachseine fishermen vs. canoe fishermen operating in coastal waters, or small-scale fishermen fishing for reef fish vs. divers collecting ornamental fish. Although dispute resolution mechanisms may have evolved, attempts are rarely made at the planning stage to adopt measures aimed at preventing the emergence of such conflicts. Additional conflict may arise between owners and non-owners of property i.e. boat owners vs. crew labourers through an imbalance in power relations and the lack of formal work agreements. Such conflict may present itself where crew from small-scale fishing communities work on industrial vessels, but also within small-scale fisheries themselves between canoe owners and their crew. Given the relationship in many small-scale fisheries between ownership of the vessel, money lending, and sale of the catch, these conflicts can easily extend to conflicts between the catching and the marketing sectors.

---

[14] Text on the four trade-offs in the following paragraphs taken from COFI paper (COFI/2003/9) Op. Cit.

The contradictions and trade-offs often implicit in policy and management decisions must be based on information from data collection and research[15]. Apart from the trade-offs, the relative costs/benefits of different strategies must also be estimated. Sometimes this involves both tangible and intangible or quantifiable and non-quantifiable elements, which makes an assessment difficult. Currently there is often little hard data and information on which to base decisions, or indeed the skills in many countries needed to complete such research. For example, what would be the cost/benefit of reducing industrial fishing activity with corresponding decreases in foreign exchange earnings, in favour of small-scale fisheries catches with increases in small-scale fishing profitability, multiplier effects and so on? What would the comparative benefits be of changing the balance of enforcement resources between land, sea and air-based operations, or between government and community policing? What would be the cost of decommissioning hydro-electric dams to re-establish small-scale riverine fisheries, so creating benefits via income and employment? How does the high cost of small-scale fisheries management compare to the cost of resource depletion, loss of employment, income and food security resulting from no management? The estimates of such costs should ideally be wider than economic costs alone, and include societal, environmental, and cultural values.

It is likely that the presence/absence of conflict is a good indicator of how successful the management system is performing. If trade-offs and conflicts at the planning stage are appropriately identified and dealt with, conflict within the fishery itself if likely to be minimized.

4.2 Examples of how conflicts are dealt with and the priority given to the small-scale fisheries

What is evident from the questionnaire responses and our own experience in many countries, is that many fisheries policy documents appear to comprise vague statements with bland introductions, followed by detailed "subsectoral" policies for research, extension, law enforcement, planning, etc. that correspond to institutional subdivisions. While some policy documents explicity refer to resolving conflicts, the real substance and detail of what should be contained within a fisheries policy, e.g. fundamental objectives, trade-offs between small- and large-scale fishing, export earnings vs. national nutrition etc. is often absent. There is a common failure to explicitly address conflicts head-on in the planning and policy process. This results in confusion in the implementation of management, with management actions often being guided more by the priority of the day and political influence, rather than by any overall framework recognizing possible trade-offs in advance, which would enable mitigating measures to be put in place to deal with the costs/impacts of such trade-offs.

Conflict between small-scale and industrial fishing activity may stem from, or be reinforced by, governance and policy issues such as inadequate enforcement capability and/or a lack of will for enforcement, or preferential treatment of industrial fisheries in both policy and management action. Some countries e.g. Mexico specifically favour the industrial sector in the policy/planning process. In countries with large small-scale fisheries sectors, the extent of policy statements and specific assistance to the small-scale fisheries sector may well be greater than to the industrial sector. The most notable exceptions to this, and ones which often skew priority towards industrial or semi-industrial fishing activities, are: (a) when exports from such fisheries can generate foreign exchange earnings for the government; or (b) when governments can generate significant resource rents by licensing industrial interests.

The failure at the policy stage to explicitly address small- and large-scale trade-offs, can certainly result in complete inaction over conflicts between the sectors, or in powerful industrial interests (foreign or local) being able to influence management actions in their favour when conflicts arise. In a number of countries industrial interests appear to be generally favoured over small-scale fishing interests when conflict arises. Examples of how such factors manifest themselves include long delays in processing complaints about incursions of industrial vessels into small-scale fishing areas, exclusion of small-scale fishers from fishing grounds, subsidies for industrial fisheries, and the payment by industrial fishing interests of arbitrary, informal incentives to obtain access to resources or markets. However, in other cases, governments may simply not have the resources to effectively protect small-scale fisheries interests. Some small-scale fishers e.g. in Guinea[16], have recently been successful in organizing themselves to establish community-based MCS activities. This has helped to provide concrete information and proof of infringements by industrial fishing interests, so that government is not just left with the word of small-scale fishers versus the word of large-scale interests.

---

[15] It must be remembered as discussed earlier in this paper that in many cases it is the lack of political will for improved management choices that is as much to blame as the lack of information on which to base such choices.

The failure to explicitly address issues of conflict between small- and large-scale fisheries is likely to become increasingly serious. Traditionally the argument has been used that trawlers can access fishing grounds which are inaccessible to small-scale fishers. Increasing pressure on stocks, and technological development in artisanal fisheries, has meant that there is increasing motivation for industrial fishers to move inshore and simultaneously for artisanal fishers to move off shore, thereby generating additional conflict.

Policy documents are usually the result of compromises and struggles for influence by different interested parties. These tensions, and the failure to explicitly recognize conflicts and solve them in the policy document through prioritization, are often most significant in setting an overall vision for the sector's development and the key objectives. They emerge in apparently contradictory statements, for example about social inclusion and poverty-targeting on the one hand, and a more aggressive modernization agenda on the other. In Uganda (Allison, 2003) the overriding policy vision is of *"sustainable exploitation of the fishery resources at the highest possible levels"* (National Fisheries Policy, 2002; p.6). In this respect, it has a much clearer goal than many other fisheries policies in the region, which simultaneously aim to maximize production, employment and revenue generation. These other policy targets are present in the Ugandan policy, but it is recognized that they must be achieved within the stated production-maximization goal, not as well as it. Indeed, it is implied that meeting production targets may involve reducing present levels of employment in fishing, although this is not explicitly stated, nor is a strategy for capacity reduction identified (in terms of numbers, volumes, or efficiencies of vessels). *"In general, the direction of change towards the industrialisation and modernization of the fisheries sector promotes the replacement of individual and family fishing enterprises by larger and more commercial operators where this can be achieved in a sustainable manner" (NFP, 2002, p9).*

In Bangladesh, open access to inland open water bodies has lead to the use of large destructive nets owned by rich people but operated by poor fishers, and entry to the fishery of a large number of small-scale fishers catching minimal quantities of fish. The implicit adoption of a social/equity objective e.g. access, has resulted in low catches for all and therefore a failure to achieve sustainability or economic objectives.

Some countries have however tackled such conflicts head-on. In Tanzania, policy specifically mentions assistance in resolving conflicts. Likewise, a large number of countries (*inter alia*, Indonesia, Qatar, Philippines, Thailand, Bahrain, Iran, Kuwait, India) have in place seasonal or area trawl bans, specifically with the intention of either a social or a sustainability objective in mind, in terms of assisting small-scale fisheries or protecting the stock, respectively. Many of the bans have come about directly as a result of conflict between small-scale fisheries and industrial interests and a number of countries have specifically dealt with conflicts between different gears and resource users.

Co-management has also been used in some countries as a method of resolving conflict, and the literature is extensive and will not be reviewed here. One example is provided however from the questionnaire responses collated as part of this review. On Lake Kariba on both shorelines there have been efforts to introduce the concept of co-management. On the Zambian side this was primarily aimed at controlling the activities of immigrant fishermen who were considered to be a security threat by local people. Other stakeholders also used the co-management concept to restrict the fishing activities of artisanal fishermen so that they could use some of these fishing grounds for other activities such as setting up tourist facilities. In Zimbabwe the co-management process was driven by the Department of National Parks as a way of controlling the activities of artisanal fishermen who were threatening the viability of the tourist industry in the fishery and surrounding areas.

---

[16] Satia, B. Pers. Comm.

However, even in countries such as Papua New Guinea which do explicitly recognize conflicting objectives in fishery management plans and other policy instruments, these conflicts can remain a key cause of implementation failure/difficulty as there are always some stakeholders who disagree with whatever trade-off has been made and who therefore actively seek to undermine policy.

A good example of how conflicts among different stakeholders are dealt with at the planning and policy-making stage is found in the Special Area Management (SAM) process which is now being implemented in many parts of Sri Lanka. This deals with conflict both within the fisheries sector, and between fisheries and other sectors. When conflicts among stakeholders are likely to lead to resource depletion/degradation in environmentally sensitive areas, these areas are identified first as areas needing Special Management Measures in the legislation. Management of such resources is then carried out by a SAM Committee consisting of representatives of all stakeholders. This has worked quite well in Sri Lanka. Two such management sites are the Hikkaduwa and the Rekawa coastal areas.

Finally, on the subject of conflict, it is also worth remembering, as highlighted by the examples of Lake Kariba and Sri Lanka presented above, that small-scale fisheries may be in conflict with other sectors and resource users, and not just with other fishing interests. Frequently such conflicts arise over both access to water bodies and land bordering water in coastal, estuarine and inland areas. As already noted, due to the low priority of the sector, fishers are often the "losers" in these conflicts.

5. CHALLENGES THAT SMALL-SCALE FISHERIES PRESENT IN ADHERING TO THE CODE OF CONDUCT FOR RESPONSIBLE FISHING (CCRF)

The text already presented in this paper in the sections on policy, legislation and management actions, and in the Sierra Leone case study, highlights a number of key challenges and problems in ensuring that small-scale fisheries adhere to the CCRF. These challenges are perhaps especially severe in many developing countries although the CCRF makes specific recognition of the special requirements and problems of implementing the Code due to capacity issues (*Article 5*). A paper presented at COFI 25[17] concluded that "*an assessment of national reports indicated that progress is being made in the implementation of the Code, but that a range of issues – which have a high degree of commonality in developing countries and across regions – constrain the rate of implementation*".

The table below describes some specific problems in ensuring that small-scale fisheries adhere to the Code based on responses provided to questionnaires, with corresponding Articles noted in the right-hand column. It should be noted that many other aspects of the Code relate to, or have an impact on small-scale fisheries, and that implementation of the Code as a whole remains a challenge in many countries.

Table 3: Challenges in implementing the CCRF

Challenges	Relevant Articles of the CCRF
Lack of sufficient awareness and knowledge of the CCRF itself. This is claimed to be due to: (i) the difficulty of accessing small-scale fishers in remote locations; (ii) the CCRF not being available in all languages[18]; (iii) the failure to use appropriate delivery mechanisms to reach small-scale fisheries; and iv) the perception by some stakeholders in small-scale fisheries that the CCRF is for industrial fisheries.	All Articles relating to small-scale fisheries. Article 7.1.10 "*States and subregional or regional fisheries management organizations and arrangements should give due publicity to conversation and management measures and ensure that laws, regulation and other legal rules governing their implementation are effectively disseminated.*"

---

[17] Cofi/2003/3rev.1: Progress in the Implementation of the Code Of Conduct For Responsible Fisheries and related International Plans of Action

[18] The Code is currently translated on the official FAO website into nine languages.

Lack of real participation by small-scale fisheries in policy, which means they do not have a strong stake in management rules or incentives to comply.	Article 7.1.2 with respect to domestic parties "*States should...establish arrangements for consulting them to gain their collaboration in achieving responsible fisheries.*" Article 7.1.6 "*Representatives from relevant organizations, both government and non-governmental, concerned with fisheries should be afforded the opportunity to take part in meetings...*". Article 7.2.2 "*... c) the interests of fishers, including those engaged in subsistence, small-scale and artisanal fisheries, are taken account of;..*"
Inadequate data on resources being exploited, and of "reference points". Quality of data is often poor, and used for compiling catch statistics rather than for guiding policies.	Articles 7.4.1 to 7.4.7.
Poverty and food-insecurity levels in small-scale fisheries, placing pressure to over-exploit resources using unsustainable methods.	Most of Articles 7 and 8 (e.g. 8.4.2 "*States should prohibit dynamiting, poisoning and other comparable destructive fishing practices*").
Difficulties in resolving conflicts in objectives, and a lack of studies completed on the costs/benefits of certain trade-offs.	Article 7.4.3 "*Studies should be promoted which provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, in particular, options relating to excess fishing capacity and excessive levels of fishing effort.*"
Insufficient regional management of transboundary stocks and inadequate harmonization of legislation related to shared stocks.	Article 7.1.3 to 7.1.7 relating to sub-regional or regional fisheries management.
Problems of enforcement when large numbers of small-scale fishers may be involved in a fishery and spread over large distances	All Articles relating to small-scale fisheries, especially Articles 7 and 8.
Low investment and operational costs which do not prevent a significant barrier to entry	Article 7.2.2 "*measures should provide inter alia that a) excess fishing capacity is avoided and exploitation of the stocks remains economically viable; b) the economic conditions under which fishing industries operate promote responsible fisheries; c)....*"

On reviewing the CCRF, given generic problems in many developing countries relating to institutional and governance capacity, numbers of small-scale fishers involved, lack of financial resources, etc. many Articles of the Code related to management in general (Article 7) and small-scale fisheries in particular, appear to present challenges in adherence. These challenges warrant separate research or a paper in its own right.

Another paper presented at COFI 25[19] implicitly recognizes the challenges for small-scale fisheries in adhering to the Code, and recommended for consideration by the Committee, the "*Development of technical guidelines on increasing the contribution of small-scale fisheries to food security and poverty alleviation*". Certainly special technical guidelines on small-scale fisheries would greatly assist many countries in ensuring that small-scale fisheries adhere to the Code. The COFI 25 Report recognized the importance of small-scale fisheries, and challenges in adherence to the Code. Paragraph 84 of the Report stated: "*The Committee requested that FAO allocate more resources to promote sustainable small-scale fisheries. It further welcomed the suggestion for the Organization to*

---

[19] COFI/2003/09. Op. cit.

elaborate, in the context of the Code of Conduct for Responsible Fisheries, technical guidelines on increasing the contribution of small-scale fisheries to food security and poverty alleviation."

Article 6.18 of the Code recognizes the *"important contributions of artisanal and small-scale fisheries to employment, income, and food security"* and that *"States should appropriately protect the rights of fishers and fishworkers, particularly those engaged in subsistence, small-scale and artisanal fisheries, to secure a just livelihood, as well as preferential access, where appropriate, to traditional fishing grounds and resources in the water under national jurisdiction."* This paper has already described how in many countries policy and legislation does comply with this aspect of the Code (with respect to issues of access, policy support etc). However, it is the implementation of policy and legislation (Article 7.7 of the CCRF) where the real challenge often lies.

6. INCENTIVE SCHEMES FOR SMALL-SCALE FISHERIES

Subsidies in fisheries may be used *inter alia* to promote the adoption of a particular technology, to shift emphasis from one resource area to another, to help asset-poor fishermen and to minimize income disparities, or to promote exports. The extent of incentives provided to the small-scale fisheries sector is in part a reflection of the priority given to them, hence why they are of interest.

Responses to the questionnaire provided some interesting information on the extent of fisheries incentives (mainly in the form of subsidies) to the small-scale fisheries sector.[20] The concept of "incentives" however is broader than one focussed just on subsidies, and may also incorporate aspects of political will which are not directly intended to change profit levels (which is the primary purpose of subsidies). For example, small-scale fisheries may be incentivized through support for traditions and customs, by developing strong community ties, etc.

Many different types of subsidies are used in a number of countries, with subsidized fishing inputs in the form of import-tax exemptions perhaps most common (eg. Albania, Burkina Faso, Nigeria, Gulf States, Tanzania, West Indies) - in some cases (e.g Oman) tied to the use of sustainable fishing equipment. This form of subsidy is interesting in that the benefits, and the potential impacts of withdrawal, obviously depend very much on the type of inputs being used by different sectors, and might well benefit larger small-scale fishers and even semi-industrial and industrial fishers as much as smaller/poorer operators - subsistence fishers operating without outboard engines for example might benefit very little. In addition, subsidies may exist specifically for industrial fisheries, for example in the form of incentives such as tax holidays on foreign investments.

Credit provision has been widely used e.g. in the Philippines, Papua New Guinea, and Mexico. Historically such subsidies were often meant for the poor and less-privileged to adopt new technology, e.g. new craft-gear combinations. In Sri Lanka for example, the drive for craft mechanization in the late 1950's was implemented using a high rate of subsidization of crafts (up to 50 percent) and the ordinary fishermen benefited significantly from this move. Subsidies were channelled through the fisheries cooperatives to ensure that they reached those who needed them most. But in other cases, evidence suggests that the asset-poor have often been unable to access credit due to either: (a) the high initial costs of new technology; and/or (b) the inability to provide appropriate collateral. In such cases it has often been the better-off fishermen, or even non-fishing sector businessmen, who have been able to make the most of such subsidies.

It is noted that subsidies can be issued in an informal way as a means of political and social currency, e.g. Bangladesh and Gulf States, and not based on longer-term policy objectives or on any hard evidence of the costs/benefits of their use.

There is a wide range of different types of subsidies that can be used to support the sector. A guide on identifying subsidies is available (Westlund/FAO, 2003), and defines fisheries subsidies as *"government actions or inactions that are specific to the fisheries industry and that modify – by increasing or decreasing – the potential profits by the industry in the short-, medium- or long-term"*. Subsidies described in Westlund (2003) include:

---

[20] It should be noted that a detailed guide did not accompany the questionnaire as to how to assess the level of incentives (which include subsidies), or indeed how incentives and subsidies should be defined.

Investment grants, income support and unemployment insurance programmes, price support, export incentives and other market interventions, import quotas, tariffs and other border measures, fuel tax exemptions, investment tax credits and deferred tax programmes, favourable loans and loan guarantees, special insurance schemes for vessels and equipment, training and extension, inspection and certification services, provision of fishing port facilities and other infrastructure, government research and development, fisheries management and environmental protection programmes, free or below market price access to fishing grounds, lack of pollution control, lack of implementation of existing regulations.

All of the above may be used to support the fishing sector as a whole, or the small-scale fisheries sector specifically. Other types of subsidies provided more normally to the industrial sector include: decommissioning, equity infusions, and payments to foreign governments to secure access to fishing grounds.

Some interesting work on assessing the extent of incentive schemes in small-scale fisheries has been completed in recent years, with other studies ongoing (e.g. by Cemare in North-West Africa). But many studies have focussed on incentives provided to industrial activities and their impact on small-scale fisheries (e.g. Marine Resources Assessment Group (MRAG)/Cambridge Resource Economics, 2000). However, while a range of work programmes related to subsidies by intergovernmental organizations are in place (e.g. see FAO Fisheries Report No. 688), knowledge of the extent of subsidies to small-scale fisheries, their impacts, and the potential impacts of removing them, still remains patchy. The issue is an important one for further research, especially in light of the World Trade Organization (WTO) consideration of fisheries subsidies post-1999.

Indeed, evidence suggests that there are few studies that have been completed on the costs/benefits of incentives/subsidies prior to their introduction in order to justify their use. The completion of such studies, and the explicit acknowledgement of potential trade-offs in objectives, is considered extremely important as it would help policy-makers target the use of incentive schemes and subsidies towards small-scale fisheries where they can be of most benefit to the poor, while minimizing any adverse impacts. The danger of using such instruments without appropriate studies and knowledge is significant. For example, when knowledge of the resource status is lacking but resources are already thought to be heavily exploited, subsidies to achieve equity objectives may lead to over exploitation.

While subsidies and incentives which lead to overexploitation might universally be considered bad, unless one takes a completely free-market perspective, one could argue that incentives and subsidies could and should sometimes be used to support social/equity objectives, even if there is some trade-off in the economic objective of efficiency. However, the use of incentives (and their removal) must be based on a case by case basis, and on the particular costs and benefits (environmental, social, economic) of their use.

Of equal importance for the use of incentives/subsidies, if they are to be approved, is to specify and justify the time for which they are to be put in place. There may be short-term reasons for providing such incentives e.g. exchange rate fluctuations, to mitigate against the negative social/economic impacts on small-scale fishers, whereas leaving such incentives in place in the long-term might have serious implications on overfishing and increasing capacity. The use of subsidies is often not targeted in sufficient detail.

7. KEY RECOMMENDATIONS ON RESEARCH TOPICS

Making recommendations about future research topics as part of this paper raises two important questions. Firstly, to what extent should small-scale fishers themselves be part of the process to agree such research agendas. This is important given the specificity of research needs to particular locales and situations, and the likelihood that the involvement of small-scale fishers will increase the chances of knowledge being gained from research being imparted to them. Research, in its broadest sense, is the collection and analysis of information to provide an answer to a specific question. The research that needs doing is therefore defined by the questions that need answering – these questions are likely to be very different in different places and at different times.

Based on indications provided by respondents to the questionnaire, a list is presented below for consideration by the ACFR of some important research topics that have been generated during the preparation of this paper. The topics proposed relate to the questions raised in the paper and the Terms of Reference, and not to other wider research requirements in small-scale fisheries. It is suggested that many of the topics could be usefully investigated through the use of case studies[21].

Possible research topics include:

- How to more effectively bring small-scale fisheries interests, and researchers working on small-scale fisheries issues, into the process of defining policy and management plans. This research should include the extent to which consultation/participation of small-scale fisheries stakeholders in policy formation and decision-making actually affects specified objectives and management action.
- The extent to which formal written policy objectives reflect informal policy objectives, and if policy objectives are different which have the greater impact on management action. This research should focus both on differences between formal and informal government policy objectives (e.g. as reflected in formal documents, speeches, action etc), and also between formal government objectives and informal objectives of other groups e.g. fishers, NGOs etc.
- Which policy objectives may be most appropriately dealt with through formal legislation, which can be tackled through informal traditional forms of management, and which through economic incentives. Research on economic instruments should also cover the extent to which they may be able to support effective fisheries management.
- The costs and benefits of different policies and strategies, in order to better understand the implications of certain trade-offs between policy objectives, particularly in terms of their distribution of benefits. Such research should be both *ex-ante* and *ex-post*.
- Successes in small-scale fisheries management, and the extent to which such fisheries have managed to continue to generate benefits and be successful, because of specific policy objectives directly feeding through into related management actions, in spite of policy, or for other reasons not related specifically to policy.
- Effective methods of human capacity building for small-scale fisheries management, e.g. in fishing organizations, management organizations, related research, etc.
- The most effective ways to bring community or local fishing organizations into a co-management process, and the extent to which existing organizations are interested in doing so.
- Given the impact on small-scale fisheries of policy, legislation, management and governance, in other sectors i.e. outside of fisheries, research is required on the impact of such policies, and legislation on small-scale fisheries and effective methods/entry points for advocacy and lobbying to ensure that such policy supports the role of small-scale fisheries, and to ensure that cross-sectoral integration is promoted.
- The extent, range and type of incentives/subsidies provided specifically to small-scale fisheries, their impact on sustainable resource exploitation and other policy objectives, and the biological, economic, and social impacts of their removal. Research should pay special attention to the relative costs/benefits of different types of subsidies to small-scale fisheries, and appropriate time-periods for which such incentives should be left in place.

---

[21] It is thought likely that both small-scale fishers and consultants have considerable experience that could be written up, or which is "lost" in consultancy reports. Given the pressure on academics to publish papers, interesting information tends to originate more from this sector, rather than from consultants who are often under pressure to move on to other fee-paying work. Likewise, small-scale fishers are occupied with the business of making money from fishing, and often have little incentive to prepare case study information that could be of great interest. Furthermore, requirements for particular styles/formats required by "respectable" fisheries journals often preclude small-scale fishers from being able to present case study material (and provide a considerable disincentive for consultants). Nevertheless, it appears a shame that the experiences of such groups are not more widely drawn upon, and more thought could perhaps be given to how such information and experiences could be better harnessed.

- Given that lack of financial resources is so often a key reason for the failure of fisheries management action to reflect policy statements, research to demonstrate the economic importance of small-scale fisheries, but also their social importance
- Given the lack of financial resources in many countries, research is also required on management approaches that are less demanding of data and expertise and which rely to a greater extent on management reference points based on agreement between stakeholders and the precautionary principle, rather than on costly and complex fisheries science.
- While the Terms of Reference for this study included coverage of the extent to which small-scale fisheries where dealt with by regional fisheries organizations, few responses were forthcoming from such organizations. As such it has not been possible to provide comprehensive information in this paper on linkages between policies, legislation and management action by regional organizations as they relate to small-scale fisheries. Noting that the remit of many regional fisheries organizations is to deal only with fisheries outside Exclusive Economic Zones (EEZs), this topic would be worthy of additional research, with specific attention on methods by which such organizations could support the role of small-scale fisheries. Such support might take the form of direct support to small-scale fisheries, or the form of policy relating to industrial fisheries that might impact on small-scale fisheries.

TERMS OF REFERENCE - APPENDIX A

The Consultant will:

Describe the policy objectives for small-scale fisheries at the regional (e.g. Regional fishery bodies), national or sub-national level in terms of stated priorities in terms of the objectives of: (i) optimal and sustainable use of fish resources and their supporting ecosystems; (ii) economic objectives, especially in relation to either small- or large-scale fisheries; (iii) social objectives, e.g. maximizing employment, improving livelihoods; (iv) objectives related to equity, e.g. access for only small-scale fisheries; or (v) any other objectives. The paper should address the extent to which these often conflicting objectives, i.e. (i) to (v) above, have been dealt with in planning and policy formulation, especially with respect to dealing with development that results in a small number of highly industrialized vessels compared with development that leads a large number of small-scale vessels.

When national fisheries policies exist, describe using one or two specific examples how the role/priority of small-scale fisheries compares with other parts of the fisheries sector. Describe the types of incentive schemes (including subsidies) that are in place to support any policies and their impacts on small-scale fisheries and what would be the likely costs/benefits of having the subsidies removed. Describe the degree (if any) of planning that has included the interaction among different gears used to harvest fish and other users of the resource.

Describe the extent to which these policy objectives are contained in legislation and regulations at regional, national and sub national levels and evaluate the extent to which management actions are actually guided by policy objectives.

Suggest possible research topics.

Questionnaire – APPENDIX B

Background to this request[22]

The FAO Advisory Committee on Fisheries Research (ACFR), at its Fourth Session in December 2002, highlighted that small-scale fisheries had not received the research attention that it deserved when one considers the important contribution that it makes to nutrition, food security, sustainable livelihoods and poverty alleviation, especially in developing countries. The Committee recommended that a working party be convened to elaborate a draft research agenda and undertake an evaluation of the role and importance of small-scale fisheries, and outline ways in which the transition to responsible fisheries could be facilitated, bearing in mind the developing paradigm of the Ecosystems Approach to Fisheries (EAF). Poseidon Aquatic Resource Management Ltd. is currently assisting FAO with the preparation of background material for the working party and prioritization of research priorities. In order to ensure collaborative input into such research priorities and agendas, and to assist with information collection, we would be most grateful if you would complete the short questionnaire below.

Could you please return the completed questionnaire, by Friday 18 July, to Graeme Macfadyen:

Graeme@consult-poseidon.com

Fax: +33 450 33 05 02 (Telephone is the same number if you have any questions)

Information requested	Answer
Your Name and Organization	Name: Organization:
Your telephone and email address	Tel: Email:
Region/Country/Regional Organization to which this response refers	

---

[22] Questionnaire also translated into French for French-speaking countries.

Are there specific policy objectives defined for small-scale fisheries in terms of: 1. optimal and sustainable use of fish resources and their supporting ecosystems; 2. economic objectives (in relation to small-scale fisheries); 3. social objectives e.g. maximizing employment, improving livelihoods 4. objectives relating to equity e.g. access; 5. any other specific small-scale fishery objectives?	Please state/quote any policy objectives relating to each of the points 1-5. Please state "no" if there definitely are not any, and "do not know" if you are not sure. Where/if possible, attach supporting text.
Are there specific policy objectives defined for small-scale fisheries in terms of: 6. optimal and sustainable use of fish resources and their supporting ecosystems; 7. economic objectives (in relation to small-scale fisheries); 8. social objectives e.g. maximizing employment, improving livelihoods 9. objectives relating to equity e.g. access; 10. any other specific small-scale fishery objectives?	Please state/quote any policy objectives relating to each of the points 1-5. Please state "no" if there definitely are not any, and "do not know" if you are not sure. Where/if possible, attach supporting text.
In your view, to what extent are these policy objectives reflected in legislation?	Please summarize any key points from the legislation related to the different objectives, and say whether you think the policy objectives1-5 are "Well", "Partially", or "Not at all" reflected in legislation, (or whether you are "Not sure") 1. 2. 3. 4. 5.

To what extent do you feel these policy objectives actually guide management actions (e.g. comment on the intention to implement them, the ability to do so, problems in doing so etc.)?	
Please provide comment on the extent to which these sometimes conflicting objectives have been dealt with in the planning and policy formulation context e.g. development resulting in small numbers of industrialised vessels vs. development that leads to large numbers of smaller vessels.	
What particular challenges do small-scale fisheries present in adhering to the Code of Conduct for Responsible Fisheries?	
In regional/national policy, how does the role/priority of small-scale fisheries compare with other parts of the fisheries sector?	Please state whether you feel that for 1-3 below priority is given (a) "primarily to industrial fishing", (b) "equally to industrial and small-scale fishing", or (c)"primarily to small-scale fishing" specific assistance/support extent/type of policy statements other (please specify)
To what extent is there stakeholder involvement in the over-all policy process and decision-making?	Please provide the mechanisms by which stakeholders are involved, if at all, and how meaningful this involvement is in affecting the policy process.
Are there any incentive schemes (including subsidies) that are in place to support small-scale fisheries?	If yes, please specify what form these take.
Have any studies been completed to consider the likely costs/benefits of removing such incentives? If so, what were the main conclusions?	If yes, please provide references if you have them.
If no to the above, what do you think the impacts would be?	
To what extent has any planning specifically included competition among different gears and resource users (e.g. area or seasonal restrictions)?	

What research topics do you feel are most necessary to support the role of small-scale fisheries (e.g. user rights, capacity, IUU, trade, incentives, governance, cost/earnings studies, sustainable livelihoods, technology, effective methods of organization, human capacity building of small-scale fishers, human capacity building of fisheries managers, other, etc)?	Could you please provide a prioritised list, with the topics you view as most important, at the top:

Thank you for your assistance. All those responding completing this questionnaire will be individually acknowledged in the report presented to the FAO working party.

REFERENCES

Adams, T. December 1996. Governance of fisheries and aquaculture in the Pacific Islands region. Review paper for 3rd Dialogue on the ACP-EU Research Initiative Belize.

Allison, E. 2003. Linking national fisheries policy to livelihoods on the shores of Lake Kyoga, Uganda. LADDER working paper No. 9 (Draft).

Chakalall, B., Mahon, R. & McConney, P. 1998. Current issues in fisheries governance in the Caribbean Community (CARICO). Marine Policy Vol. 22, No. 1.

FAO. 2002. Report of the Second ad hoc meeting of intergovernmental organizations on work programmes related to subsidies in fisheries. FAO Fisheries Report No. 688. Rome.

FAO. February 2003. Strategies For Increasing The Sustainable Contribution Of Small-Scale Fisheries To Food Security And Poverty Alleviation. Committee on Fisheries. Twenty-Fifth session. COFI/2003/9.

FAO. 2003. Progress In The Implementation Of The Code Of Conduct For Responsible Fisheries And Related International Plans Of Action. Cofi/2003/3rev.1.

Hanna, S. 1998. Parallel institutional pathologies in fisheries management. In Symes, D (Ed) Northern Waters: Management issues and practice. Fishing News Books.

Macfadyen, G. 2000. Review and analysis of existing fisheries laws and regulations in Sierra Leone, and recommendations on legislative and institutional changes. In Development of a Fisheries Sector Strategy: Sierra Leone Project No.6 ACP SL 49. Funded by the European Commission and undertaken by Megapesca Lda. (Note, not officially released and therefore not to be quoted from or referenced without permission).

MRAG & Cambridge Resource Economies. December 2000. Summary review of the impacts of fisheries subsidies on developing countries", DFIF Policy Research Programme Project.

Poseidon Aquatic Resource Management Ltd, Fisheries Discards: An Assessment of Impacts and a Review of Current Legislation and Reduction Programmes. 2003 (FAO, In Press).

Swan, J. 2000. "Regional Fishery Bodies and Governance: Issues, Action and Future Directions". FAO Circular No. 959.

Turay, F. 1995. PhD Thesis by Foday Turay, "An economic analysis of artisanal fisheries management alternatives in West Africa: the case study of the marine pelagic fishery in Sierra Leone".

Uphoff, N. 1986. Local Institutional Development: An Analytic Sourcebook with Cases. Kumarian Press.

Westlund, L. 2003. Draft guide for identifying, assessing and reporting on subsidies in the fisheries sector. Lena Westlund FAO. ftp://ftp.fao.org/docrep/fao/005/y4446e/y4446e00.pdf.

5. PROMOTING THE ECOSYSTEM APPROACH TO FISHERIES IN THE CONTEXT OF SMALL-SCALE FISHERIES

B.P. Satia

SUMMARY

This paper articulates the combined use of the Sustainable Livelihoods Approach (SLA) and the Ecosystem Approach to Fisheries (EAF) in promoting ecosystem considerations in Small-Scale Fisheries (SSF). The paper points out that EAF and SLA have much in common both in what they aim to achieve and the approach they adopt, and that the strong similarities between the two approaches justify their combined use in promoting effective SSF management in an ecosystem context.

EAF could supplement the SLA in specific instances concerned with the conservation and management of natural capital and with transforming policies, institutions and processes (PIP) related to the sustainable use of aquatic living resources by SSF. Conversely, the SLA could complement the EAF implementation in the rural, small-scale fishery sector where specific approaches are needed, in particular, when assessing potential impacts of policies and finding support for their implementation.

It is suggested that policy related research undertaken by multidisciplinary teams, including scientists/experts outside the fisheries sector and local scientists, through case studies, research on participatory methods, and of what indicators are appropriate in relation to SSF as well as studies on how to integrate good information from various sources including local knowledge and scientific information and data would be appropriate ways to increase our understanding on how to maximize returns, both for human and ecological well being, by using these combined approaches in small-scale fisheries.

The paper is in five parts. Part I outlines the origins and justification for this paper. Part II briefly describes EAF and SLA and outlines the similarities between the two approaches in the perspective of their possible use in SSF and compares, in a tabular format (Table 1), the FAO Code of Conduct for Responsible Fisheries (Code), EAF and SLA. In Part III, the paper identifies the main entry points of EAF in SLA and in Part IV suggests key areas which require research and emphasis to facilitate the combined use of EAF cum SLA in SSF. Part V, the Conclusion, refers to the benefits of combining the two approaches in SSF but also cautions that the process will take time and there will be trials and errors, with greater demands for training on these evolving paradigms.

1. INTRODUCTION

The purpose of this paper is to present briefly the strong similarities between the Ecosystem Approach to Fisheries (EAF) and the Sustainable Livelihoods Approach (SLA) and articulate their combined use in promoting ecosystem considerations in Small-scale Fisheries (SSF).

It is hoped that studies in the areas identified in this paper as deserving further research/emphasis, will contribute to improving understanding on how to operationalize EAF in SSF, contribute to the development of a tool box in this area, and also facilitate the transition to responsible SSF, bearing in mind the developing paradigm of EAF.

In recent years, there has been a deeper and broader sense of stewardship in response to increased awareness of the importance of aquatic resources and the deteriorating status of fisheries. The international community recognizes that there are a wide range of societal objectives for and values of fisheries resources and aquatic ecosystems within the context of sustainable development and that current management approaches have not been very successful, as witnessed by the poor state of many world fisheries. In addition, recent scientific advances have raised awareness and highlighted uncertainties about the functional value of ecosystems. It is felt that these shortcomings could be reduced or corrected by placing greater importance on the interactions among fishery resources, and between fishery resources and the dynamic and variable ecosystems within which they exist, dealing with the cornerstone issues of excess capacity, allocation, incentives, etc. from an ecosystem perspective. This requires that we operationalize the ecosystem approach to fisheries (EAF).

EAF implies the introduction of ecosystem considerations into all dimensions of fisheries. EAF strives to balance diverse societal objectives, by taking into account the knowledge and uncertainties about abiotic and biotic (including human) components of ecosystems and their interactions, and applying an integrated approach to fisheries within ecologically meaningful boundaries. The overall objective of EAF is improved natural resource management (NRM) at an ecosystem level for the economic and social benefits of the fishworkers and consumers.

EAF is not a departure from past fisheries management paradigms. The ecosystem approach to management of the oceans and their resources was consolidated in Agenda 21. Review and coordination of implementation of this area among United Nations agencies, has been facilitated by the Sub-Committee on Oceans and Coastal Areas (SOCA) of the Inter-agencies Committee on Sustainable Development operating under the umbrella of the UN Administrative Committee on Coordination (ACC). At its Ninth Session, in July 2000, SOCA considered the relevance of the regional setting for improving coordination among different UN programmes addressing different aspects of coastal and ocean management. Its purpose was the exploration of new ways to integrate the work of the agencies and, in particular, to look for synergies between regional organizations respectively competent for fisheries and for the marine and coastal environment. It was felt that the challenge posed by the development of ecosystem approaches to fisheries management and integrated coastal management could be considered by both types of bodies as a potential platform for practical cooperation[1]. The need for such coordination has also been recognized by marine Regional Fishery Bodies (RFBs) and the United Nations Environment Programme (UNEP) in the recent past[2].

As a first step in this direction, it was agreed that a paper centered around ecosystem-based management in fisheries would be jointly developed by FAO and UNEP. The purpose of this paper is to present consideration which can serve as the basis for potential cooperation between regional fishery bodies (RFBs) and regional seas conventions (RSCs). It describes the concept of fisheries management, the relevant mandates and activities of RFBs and RSCs and the relationships and mutual relevance of their work. Possible mechanisms for cooperation, and issues for future considerations are identified. It is anticipated that such cooperation would be best carried out on a site specific or regional basis, after an initial consideration at the global level by RFBs and RSCs[ref 1].

At its Twenty-fourth Session, 28 February to 4 March 2001, the FAO Committee on Fisheries (COFI) welcomed the opportunity to address the ecosystem approach to fisheries in the planned Reykjavik Conference on Responsible Fisheries in the Marine Ecosystem and agreed to place greater emphasis on the promotion of ecosystem approaches to fisheries. The Reykjavik conference, held from 1 to 4 October 2001, culminated in the adoption of the Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem[ref 2], which *inter alia* requested that FAO prepare guidelines for best practices with regard to introducing ecosystem considerations into fisheries management[3].

FAO initiatives towards an EAF were supported at the World Summit on Sustainable Development (WSSD), Johannesburg, South Africa, 2002, which adopted a Political Declaration and a Plan of Implementation in relation to capture fisheries. In the Declaration, the Heads of State agreed to develop and facilitate the use of diverse approaches and tools, including the ecosystem approach, the elimination of destructive practices, the establishment of marine protected areas and the restoration of depleted stocks in order to achieve sustainable fisheries.

FAO has elaborated technical guidelines on the ecosystem approach to fisheries[ref 3] as well as a technical paper on the subject[ref 4]. The analysis in this paper is based mainly on the guidelines from the point of view of SSF.

---

[1] Report of the ACC Sub-Committee on Oceans and Coastal Areas on its Ninth Session, London, 26-28 July 2000, paras. 96 and 97.

[2] RFBs are, in general, concerned about the impacts from other sectors affecting fisheries, including land-based pollution and habitat, as well as the impacts of non-sustainable fishing or fishing techniques and climate. Their concerns and mutual cooperation have been consolidated in the context of biennial meetings of FAO and non-FAO Regional Fishery Bodies or Arrangements, initiated in 1999. UNEP has, on a formal basis, addressed this issue at a number of its meetings, in particular at the First Inter-Regional Programme Consultation (the Hague, 24 to 26 June 1998), as well as at the Second Global Meeting on Regional Seas Conventions and Action Plans (the Hague, 5-8 July 1999).

[3] Report of the Twenty-fifth Session of the Committee on Fisheries, Rome, Italy, 24 -28 February 2003, para. 85-94.

To ensure continuity with conventional fisheries management, the FAO Guidelines on EAF use the fisheries management guidelines of the Code as a template and reinforce those sections most pertinent to EAF[4], adding to them, as appropriate, to ensure due attention is given to the extra dimension required by EAF[5].

The FAO Advisory Committee on Fisheries Research (ACFR), at its Fourth Session, in December 2002, highlighted that small-scale fisheries had not received the research attention that they deserved considering the important contribution they make to nutrition, food security, sustainable livelihoods and poverty alleviation, especially in developing countries. The Committee pointed out that although many of the issues, such as user-rights, excess capacity, illegal, unreported and unregulated fishing, trade and incentives, governance, etc., are common across all fisheries, they need explicit attention in the small-scale fisheries (SSF) context. The Committee recommended that a working party be convened to elaborate a draft research agenda, evaluate the role and importance of small-scale (marine) fisheries and outline ways in which the transition to responsible fisheries could be facilitated, bearing in mind the developing paradigm of EAF[ref 5].

The Twenty-fifth Session of COFI in February 2003 recognized that EAF was fully relevant for SSF management. The Committee suggested that FAO, through case studies on SSF, develop an adopted EAF toolbox with rapid appraisal techniques, participatory processes, conflict resolution, integrated resource assessment and management, including co-management and capacity-building[6].

For the purpose of this paper, SSF can be broadly characterized as employing labour-intensive harvesting, processing and distribution technologies to exploit marine (and inland water) fishery resources. The activities of this subsector, conducted full-time or part-time, or just seasonally, are often targeted on supplying fish and fishery products to local and domestic markets, and for subsistence consumption. Export-oriented production, however, has increased in many small-scale fisheries during the last 20 years because of greater market integration and globalization. While typically men are engaged in fishing and women in fish processing and marketing, women are also known to engage in near shore harvesting activities and men are known to engage in fish marketing and distribution. Small-scale fisheries operate at widely differing organizational levels ranging from self-employed single operators through informal micro-enterprises to formal sector business. This subsector, therefore, is not homogeneous within and across countries in any region. Other ancillary activities of the subsector, such as net-making, boat-building, engine repair and maintenance, can provide additional fishery-related employment and income opportunities in fishing communities[7].

In the process of facilitating the transition to responsible SSF in an ecosytem context, it would seem logical to take into account the principles of the SLA. SLA is a participatory learning process that provides (local people) the opportunity to think about the objectives, scope and priorities concerning their livelihoods, take steps to improve their capabilities, assets, including both material and social resources, and activities required for a means of living to achieve lasting improvements against the indicators of poverty that they themselves identify from a baseline they define. At a practical level, this means that the approach:

- starts with an analysis of people's livelihoods and how these have been changed over time;
- fully involves people and respects their view;

---

[4] The broad principles and approach for effective and responsible fisheries management are contained in the FAO Code of Conduct for Responsible Fisheries, many of which relate to an ecosystem approach to fisheries. EAF is, in effect, a means of implementing many of the provisions of the Code and provides a way to achieve sustainable development in a fisheries context.

[5] Suceint summaries on EAF and SLA are available as separate documents at this meeting. Also available are copies of the FAO guidelines on EAF.

[6] Report of the Twenty-fifth Session of the Committee on Fisheries, Rome, Italy, 24-28 February 2003, para. 90.

[7] At its Twenty-fifth Session, the Committee on Fisheries discussed "Strategies for increasing the contribution of SSF to food security and poverty alleviation", on the basis of the characterization of SSF given in this paper. (See also COFI/2003/9, http://www.fao.org/docrep/meeting/005/Y8111E.htm).

focuses on the impact of different policies and institutional arrangements upon people/households and upon the dimensions of poverty they define (rather than on resources or overall outputs *per se*);

- stresses the importance of influencing these policies and institutional arrangements so that they promote the agenda of the poor;
- works to support people to achieve their own livelihood goals (although taking into account considerations regarding sustainability).

SLA, as a participatory exercise is formalized by the people themselves at each step of the process.

The SLA has been in existence, and has been evolving, since the 1980s. It is used by a number of development agencies such as the United Nations Development Programme (UNDP) and the UK Government's Department for International Development (DFID). DFID's approach to sustainable livelihoods was formalized in UK Government's *White Paper on International Development* in 1997[ref.6]. SLA has recently found its place within FAO through a number of policy-related projects in fisheries, forestry and livestock supported by DFID. The fisheries project in question is: the *Sustainable Fisheries Livelihoods Programme* (SFLP) in 25 coastal and landlocked countries in West Africa[8]. The overall goal of the SLA is poverty eradication. Poverty is seen both in terms of actual poverty and vulnerability to poverty. Globally SSF workers have been identified as one of the world's poorest groups. It is recognized that the situation must change if the vulnerability of SSF is to decrease and if those in the sector who are poor, are to have their livelihoods improved[refs 7, 8]. The analysis in this paper with regard to SLA is based mainly on the document by Carney and on lessons learned in applying SLA in the SFLP.

2. SUMMARY INFORMATION ON BOTH EAF AND SLA, AND COMPARISON BETWEEN THE TWO APPROACHES

Ecosystem Approach to Fisheries

Many attempts have been made to define "ecosystem". In this paper, an ecosystem is defined as an organizational unit consisting of an aggregation of plants, animals, including humans and micro-organisms, along with the non-living components of their environment.

A functional principle is that ecosystems are one in a hierarchy of biological organizations in which the integrated whole is more than the sums of the parts and are comprised of living plants and animals, including man as well as non-living or abiotic structures. Ecosystems can be defined at many scales, they may overlap or be nested together. Although they can be spatially defined, most of them have no fixed boundaries, especially within the aquatic environment and they can exchange matter and information with neighbouring ecosystems. However, to implement EAF at an operational level, delineation of the boundaries is necessary.

Ecosystems are sustainable when they are healthy, maintain integrity and productivity. These terms are defined as follows:

Ecosystem health i.e. an ecosystem being able to maintain its structure [organization] and function [vigour] over time in face of external stress [resilience].

Ecosystem integrity i.e. the ability of an ecosystem to support and maintain a balanced, harmonious, adaptive biological community that demonstrates species composition, diversity and functional organization, comparable to that of natural habitat in the region.

Ecosystem productivity i.e. the ability of an ecosystem to produce goods and services to meet human needs.

---

[8] The Sustainable Fisheries Livelihoods Programme (SFLP) represents a partnership between FAO, DFID and 25 participating countries of West Africa. The SFLP uses the Code, and poverty profiling as tools in the SLA context to facilitate changes in policies, institutions and processes to achieve poverty reduction in coastal and inland fisheries communities by improving livelihoods of people dependent on fisheries and aquatic resources.

Key components of EAF

The key components of EAF are its goals, objectives, framework and principles.

The overall goal is to plan, develop and manage living aquatic resources in a manner that addresses the multiple needs and desires of societies, without jeopardizing the options for future generations to benefit from the full range of goods and services provided by aquatic ecosystems.

These goods and services would include food security, poverty alleviation and sustainable development, but also conserving biodiversity, maintaining fishery habitats and protecting important food chains. This goal is realized through the achievement of the following broad objectives:

(i) Enhancing individual and community wellbeing and welfare by following a path of economic development that safeguards the welfare of future generations;

(ii) Providing for equity within and between generations, and

(iii) Protecting biological diversity and maintaining essential ecological processes and life support systems.

These broad objectives correspond to the broad concepts of maintaining ecosystem health, ecosystem integrity and ecosystem productivity and utilizing the productivity in an equitable manner.

However, these objectives can only be achieved by transforming these concepts to more detailed issues such as conserving biodiversity, maintaining fishery habitats, protecting important food chains functioning, etc. and then translating these issues into sub-issues until one arrives at specific issues or activities that can be related to operational objectives and can be realized by applying a management measure.

The **strategies for translating policy goals** into action include:

- identifying broad objectives relevant to the fishery (or area) in question;
- further breaking these objectives into smaller priority issues and sub-issues that can be addressed by management measures;
- setting operational objectives;
- developing indicators and reference points;
- developing decision rules on how the management measures have to be applied, and
- monitoring and evaluating performance.

The principles of the EAF

Like any other approach, EAF has a set of elements to determine the way to implement sustainable development in the fisheries context. It deals with current fisheries management practices and more explicitly recognizes the interdependence between human wellbeing and ecosystem wellbeing.

EAF emphasizes the need to maintain or to improve ecosystem health and integrity and to maintain or increase fishery productivity for both present and future generations. Fisheries have the potential to alter the structure, biodiversity and productivity of aquatic ecosystems. However, the natural resources should not be allowed to decrease below their level of maximum productivity. EAF attempts to do this by addressing a number of concepts that have been expressed in instruments and particularly in the Code of Conduct for Responsible Fisheries[9].

Applied in a consistent manner with the provisions of the Code, fisheries management under EAF respects the following principles:

fisheries should be managed to limit their impact on the ecosystem to the extent possible;

---

[9] To ensure continuity between conventional fisheries management and EAF, the FAO EAF Guidelines used the fisheries management guidelines as a template and reinforced those sections most pertinent to EAF, and added to them as appropriate to ensure that they gave due attention to the extra dimension required by EAF.

- ecological relationships between harvested, dependent and associated species should be maintained;
- management measures should be compatible across the entire distribution of the resource (across jurisdictions and management plans);
- precautionary approach should be applied because the knowledge on ecosystems is incomplete, and
- governance should ensure both human and ecosystem wellbeing and equity.

The ecosystem framework

The EAF framework is a tool to help understand the elements of sustainable development in the fisheries context and the processes by which it could be used.

The EAF framework described in the FAO Guidelines on EAF as "Moving Towards EAF Management" provides guidance on what needs to be done in terms of implementation of the approach. The guidelines also provide leads on how it should be done.

The framework consists of eight main categories.

- *The fisheries management process*: The setting of economic and social objectives would need a broader consideration of ecological values and constraints than is presently the case. Broader stakeholder base, increased participation and improved linkages of fisheries management with other planners working on aquatic ecosystems.
- *The biological and environmental concept and constraints*: Greater emphasis in management practices would need to be given to the fact that many components are intrinsically linked in the system in a complex flow of material, energy and information.
- *The technological considerations*: Greater attention should be given to broadening the approaches to include other measures such as modifying populations by restocking or culling, where appropriate and effective. Habitat restoration, and marine protected areas (MPAs) would need to be established in the context of facilitating fishing activity or enhancing the populations of target species, as well as protecting biodiversity and providing broader benefits to the system as a whole. In addition, consideration should be given to the development and successful introduction of alternative cost-effective technologies and fishing practices. Fisheries managers would need to take a proactive approach so that their appropriate authorities recognize fisheries as an important stakeholder in these sectors.
- *The social and economic dimensions*: Emphasis should be laid on the wider economic, social and cultural benefits that can be derived from fisheries resources and the ecosystems in which they occur as a broader range of ecosystem goods and services is under scrutiny. This would imply the need for addressing a wider range of trade-offs between different uses, non-uses and user groups. Traditional fisheries management practices would need to be taken on board and the dependence of SSF communities on fishing for their livelihoods and food security would need to be addressed and indeed stressed.
- *The institutional concepts and functions*: There would be a need for better institutional coordination, for example, between ministries. This will require clarification of roles and responsibilities, improved coordination and integration across government and other users and more accountability across all stakeholders groups. Greater emphasis would be placed on planning and capacity-building, aimed at improving, understanding of ecosystem structures and functions, training of managers and regulators to deal with a broader range of options and trade-offs, conflicts, rights and regulations, etc.
- *The timescales in the fisheries management process*: Longer timescales would be needed when dealing with issues such as climate change or the wellbeing of future fisheries generations. However, the usual timeframes for fisheries management process – a policy cycle of about five years, a fishery management planning and strategy cycle of three to five years,

and a shorter cycle of management implementation and review at an operational level, usually annually, would still be appropriate.

The precautionary approach: It would gain even greater significance because it is expected that uncertainty would be recognized to be much greater than typically is the case in conventional fisheries management. This is because, under EAF, the principle is much broader than environmental degradation and applies to any undesirable outcome (ecological, social or economic) in all stages of the management process.

The special requirements of developing countries: Significant additional burden and challenge would be faced, particularly in small-scale fisheries where the difficulty and cost of the transition to effective management may outlay the available capacity and short-term economic benefits derived from it. The problems are likely to be accentuated where poverty is widespread or alternatives to fisheries are scarce. Efforts would need to be devoted therefore to mobilize more resources to implement EAF.

Expected outcomes

The expected outcomes, if the principles of EAF were effectively applied or implemented, include: the elimination or reduction of overfishing; the rebuilding of depleted stocks and the environment; a reduction in the negative impact of fishing operations on fish stocks; the conservation of biodiversity; a more appropriate application of the precautionary approach with improved research to better understand ecosystems; taking measures that account for complexity, dynamics of uncertainties, and giving better attention to transboundary impacts.

Other outcomes include improved human wellbeing and equity, better allocation of user rights, the promotion of sectoral integration, the broadening of stakeholders' participation, and maintenance of ecosystem integrity.

Threats to implementing EAF

A number of factors are likely to threaten the implementation of EAF. These include the following:

- the difficulty of reconciling competing objectives of the multiple stakeholders;
- insufficient or ineffective participation of stakeholders in the development and implementation of the approach;
- insufficient knowledge, as well as biological uncertainties combined with ecological uncertainties;
- lack of adequate capacity for informative compilation and analysis of available information;
- inadequate solutions to equity issues;
- insufficient definition of the roles and responsibilities among stakeholders;
- inappropriate stakeholder behaviour as exemplified by illegal, unreported and unregulated fishing, and
- poverty, particularly within fishing communities and at the national level.

3. SUSTAINABLE LIVELIHOODS APPROACH (SLA)

Globally, small-scale fisheries (SSF) have been identified as one of the world's poorest groups. This belies the great diversity of livelihoods of SSF workers between and within countries. However, what many SSF workers have in common is vulnerability. Many of the world's resources are at or beyond the level where maximum yields can be sustained in the long-term. In addition many of the aquatic environments are being degraded by a range of activities including industry, urban development, agriculture and mining. It is recognized that the situation must change if the vulnerability of SSF is to decrease and if those in the sector who are poor, are to have their livelihoods improved.

Poverty can be described in both relative and absolute terms. Absolute terms tend to relate to a minimum set of quantifiable conditions which would have application globally. Whilst these are of value for national comparisons, they probably mean little to poor people themselves. The people might describe poverty in very different terms and it is these terms which concern the SLA. Some of the many ways in which people see the quality of their lives and how they wish their lives to change are provided in this paper under "Livelihoods Outcomes".

Vulnerability is the susceptibility of people to poverty. They may not be poor at present but their livelihoods, or the external environment which shape them, may have features which risk movement toward poverty. SLA is seen as a mechanism to address these shortcomings.

Key components of the SLA

The key components of the SLA are:

- Its goal
- Its core objectives
- A sustainable livelihoods framework
- A set of principles

The overall goal of the SLA is poverty eradication. Poverty is seen both in terms of actual poverty and vulnerability to poverty.

The goal of the SLA is reached through the achievement of six core objectives (see box 1).

Box 1: The core objectives of the SLA

- More secure access to, and better management of, natural resources.
- Improved access to high-quality education, information, technologies and training and better nutrition and health.
- A more supportive and cohesive social environment.
- Better access to basic and facilitating infrastructure.
- More secure access to financial resources.
- A policy and institutional environment that supports multiple livelihood strategies and promotes equitable access to competitive markets for all.

The sustainable livelihoods framework has been developed to help provide guidance on what needs to be done in terms of the implementation of the approach. The principles provide guidance on how it should be done.

Livelihoods

The word "livelihoods" can be used in many different ways. The definition within the SLA is:

Livelihoods comprise the capabilities, assets and activities required for a means of living.

Livelihoods are sustainable when they:

- are resilient in the face of external shocks and stresses;
- are not dependent upon external support;
- maintain the long-term productivity of natural resources, and
- do not undermine the livelihoods of, or compromise the livelihoods options open to, others.

The principles of the sustainable livelihoods approach

The SLA is a flexible approach but its principles are an essential element of the approach which should not be compromised. They are the guidelines on how the approach should be implemented. The principles are outlined below.

People-centred: People, rather than resources, are at the centre of the SLA. Sustainable resource-use is one way of achieving benefits for the people involved in the sector. The SLA defines success in terms of the achievement of benefits which the SSF workers define themselves. It builds on their strengths and capacities, relates to their existing livelihoods strategies, and aims to achieve sustainable benefits which they consider as important.

Responsive and participatory: Poor and vulnerable people themselves must be the key players in the development process. Achieving success in the SLA is done with real and active participation of the poor. External operators are there to facilitate, to listen and to respond.

Multi-level: The SLA works at all levels. It works in fishing communities and groups, at district government, central government, regionally and globally. Most importantly it works at the linkages between levels. It is only when these micro-macro linkages are fully operational that the four elements of sustainability can be achieved.

Conducted in partnership: The SLA is implemented in partnership with the private sector, NGOs and the government. It cannot work with only one of the partner groups.

Sustainable: As the name implies, the SLA aims for outcomes which are sustainable.

Dynamic: The SLA recognizes the dynamic nature of the livelihoods of the poor and vulnerable; it is flexible and responds to change.

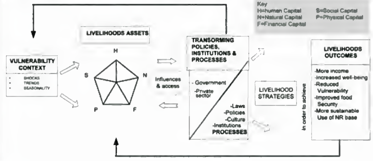
Holistic: The SLA approach attempts to identify people's most important wants and needs regardless of where they occur in terms of which sector, location, or level. The SLA also recognizes that there is a diversity of participants whose needs, aspirations and capacities will be different.

This does not mean that a holistic analysis of people's circumstances must always lead to a fully holistic response. For example the SLA allows for a sectoral focus on intervention but promotes linkages between sectors.

The sustainable livelihoods framework

The sustainable livelihoods framework is a tool to help understand the SLA and to understand the actual livelihoods of people dependent on SSF. It is also useful for planning the implementation of the SLA. The framework consists of five components: (1) the vulnerability context of the world in which the fishworkers operate; (2) the livelihoods assets of the fishworkers; (3) Policies, Institutions and Processes (PIP) which affect their lives; (4) the livelihoods strategies which the fishworkers adopt, and (5) the outcomes they achieve or to which they aspire. The framework is shown in Box 2.

Box 2: The sustainable livelihoods framework



The framework provides a checklist of important issues and shows how these links to each other. It draws attention to core influences and processes. It also emphasizes the multiple interactions between the various factors which affect livelihoods. The arrows in the framework are used to show a variety of different types of relationship which will vary in different situations. The different components of the framework are outlined below.

Vulnerability context

The *"vulnerability context"* is the group of factors operating in the external environment in which people exist and which may affect their susceptibility to poverty.

The livelihoods which people adopt, and the livelihoods outcomes they aspire to, are greatly affected by the vulnerability context. There are three key areas which broadly summarise the factors contributing to the vulnerability context. These are trends, shocks and seasonality.

Box 3 below gives some examples of each of these in the context of SSF.

Box 3: Examples of the different types of factors contributing to the vulnerability context

Trends:	**Shocks:**	**Seasonality:**
➢ Declining stocks ➢ Increasing poverty ➢ Declining access to markets ➢ Increasing population dependent on aquatic resources ➢ Rising environmental degradation (biodiversity loss, pollution, habitat destruction, coastal erosion, mangrove loss) ➢ Rising inflation rates and interest on borrowing	➢ Conflict between resource users (large-scale/small-scale) ➢ Economic shocks ➢ Sudden fall in the availability of fish ➢ Outbreak of disease associated with fishing communities and groups ➢ Outbreaks of war	➢ Seasonal availability of fish ➢ Seasonal migrations of fishermen ➢ Seasonal health issues ➢ Seasonal wage labour opportunities ➢ Seasonal demand for fish or particular species ➢ Seasonal insect infestation in processed fish

The vulnerability context is important because it has a direct impact on the lives of SSF workers. Some elements of the vulnerability are outside the control of governments and fishworkers to influence e.g. seasonal availability of fish. Others, such as declining fish resources and conflict between groups of fishworkers, can be addressed.

Livelihoods assets

The SLA is mainly concerned with poor and vulnerable people, such as many of the groups who depend on SSF. The SLA starts from understanding peoples' strengths and builds on them. The SLA refers to peoples' strengths as "capital assets". There are five types of capital assets: human, social, natural, physical, and financial.

Human capital represents elements such as the skills, knowledge, ability to work and good health. All the things which allow a person to pursue a sustainable livelihoods. Without human capital, people are unable to effectively use the other four types of capital. Support to human capital can be directly (such as in the form of training in fishing skills, group organization, processing, credit management) or indirectly (such as through improved education and health policies which support their fishing communities and groups, or through increasing food security from fish by good management).

Social capital is the networks and relationships which exist in communities and groups, and which people make use of in their livelihoods. Some of these are very informal such as trading linkages (e.g. when migrating fishermen link up with fish traders in other countries to sell their fish). Others might be more formal (e.g. where fish processing women belong to a processor group).

Natural capital is the natural resources from which benefits flow to the small-scale fishing communities and groups. These include the fisheries resources themselves and their biodiversity; the mangroves which are used for buildings, and which are also breeding grounds for some species of fish; the sea, lakes and rivers which people fish in and use for transport; freshwater for drinking; good agricultural land for gardens, and forests for fuel wood for fish smoking and cooking, and for timber for houses.

Physical capital is the infrastructure and tools/equipment used to support livelihoods. Of direct fisheries importance to SSF communities and groups are infrastructure such as harbours and jetties, fish landing areas, gear stores, smoking kilns, and ice plants. Tools for production include boats, nets, engines, processing equipment, and ice boxes. Less obvious examples are roads, houses, schools, water supply systems, health clinics, market places, and meeting places.

Financial capital is the financial resources which people use to achieve their livelihoods strategies. It not only consists of cash and savings but also access to credit, and to the ability to quickly and easily converting other assets (such as cattle or jewellery) into cash. Remittances from family members working in the city or overseas may also be important.

Policies, institutions and processes (PIP)

Policies, institutions and processes are the elements that shape the livelihoods of the SSF workers.

Transforming policies, institutions and processes can influence the access which people in SSF have to various assets, the terms under which those assets are traded, and the value of the outcomes of livelihoods strategies.

Institutions are physical entities which often generate the processes. The processes, in turn, determine the way in which those institutions operate. These might include the mechanisms which allow people in SSF to participate in decision-making processes on management and policy. They will include fisheries sector policies but may include a diversity of other policy areas that relate to SSF workers, such as poverty alleviation policies, rural development policies, and education and health policies. (See Box 4).

Box 4: Examples of different structures/institutions and processes related to SSF

Institutions:

- Policy-making and planning departments
- Enforcement agencies and courts
- Fisheries management bodies
- Regional fisheries management and development bodies
- Fisheries research and extension agencies
- Government inputs suppliers
- Commercial enterprises and corporations proving inputs to the sector
- NGOs
- Trade organizations at a higher level than the community or group

Processes:

- National development policies
- Fisheries sector policies
- International agreements (e.g. Code, UNCLOS)[10]
- Regulations and rules governing fishing, trading and food quality
- Markets for fish
- Licensing arrangements for both local craft and foreign vessels
- Societies norms and beliefs (such as prohibitions on eating types of fish at certain times)
- Age, gender, ethnic groups, class

Transforming policies, institutions and processes can affect the whole of the rest of the framework. They can lead to poorly managed fisheries and thus affect the vulnerability context in which fishworkers operate. Legislation may limit the involvement of the SSF workers in decision-making processes and thus reduce the effectiveness of their social assets.

---

[10] United Nations Convention on the Law of Sea

When looking at transforming policies, institutions and processes it is useful to look at roles, responsibilities, rights, and relations of the different participants in these policies, institutions and processes (e.g. What rights do fishworkers have in defining fisheries management objectives? Whose responsibility is it to enforce the legislation on fishing gear? What is the relationship between the fisheries department and part-time fish workers?).

Current institutions, policies and processes in many countries work to the detriment of the SSF. Making these institutions, policies and processes more positively oriented to the SSF workers will be a major part of any development effort using the SLA. This can be done by helping to build institutions which allow the SSF workers to be more effective (such as mechanisms to allow the fishworkers to participate in the policy process or to contribute to research prioritization) or which allow the government structures to be more focussed on the needs of the SSF workers. Help can also be provided to fisheries departments to gain the skills they need to facilitate greater participation of the SSF sector in planning their own development and contributing to the sustainable use of the fisheries resources.

Creating property rights over fish resources for the SSF workers or introducing community-based co-management structures may be important. Improving access of SSF products to markets may also be important as may limiting the dumping of industrial catches on domestic markets. Risk-reducing mechanisms, such as insurance schemes for fishworkers, may be facilitated through changes to the legislation or through the provision of guidance and information.

Livelihoods strategies

Livelihoods strategies are the range and combination of activities and choices that people undertake or make to achieve their livelihoods goals.

SSF workers often focus on more than one livelihoods strategy. A household may engage in fishing, fish processing and trade, and in producing and selling garden produce. Sometimes those involved in SSF will have to enter into wage labour during the year because of seasonal fish shortages. Often the different members of the household will live in different places at different times of the year (for example migratory fishermen may leave their home country and travel to another country for many months leaving their families behind). These activities contribute to a diversity of strategies.

When analysing livelihoods strategies it is important to realise that those people involved in SSF are not a homogenous group. There are many different stakeholders and they may have distinct or subtle differences in their respective strategies. One of the difficulties to be encountered by the SLA is that different groups of people sometimes have competing livelihood strategies and it may be difficult to accommodate everyone's needs. It will be important to recognize these competitive elements and to work out approaches which generate some harmony between them.

Livelihoods outcomes

Livelihoods outcomes are the achievements or outputs of livelihoods strategies.

Livelihoods' outcomes can be defined in terms of both what people actually achieve and what they aspire to achieve (livelihoods' goals). These outcomes will be very different for different people and the SLA does not assume that it is possible to define livelihoods' goals from the outside. These must be defined by the people themselves.

The aim of the SLA is to improve the outcomes of the livelihoods of those people involved in SSF in ways which reflect their aspirations and needs.

There are a wide diversity of actual and potential outcomes (see Box 5).

Box 5: Broad categories of livelihoods outcomes

More income	This is an important consideration for many people because it often gives them the opportunity to improve their other capital assets e.g. increased wealth can result in better housing (physical capital) or access to stronger social structures (social capital).
Increased well-being	People also value non-material things such as a sense of inclusion (e.g. in decision-making processes about sector), physical security or employment, access to services and maintenance of their cultural heritage.
Improved food security and better health	Closely linked to increased wellbeing is improved food security and better health. In SSF access to resources is directly linked to food security. A good balanced diet is essential for maintaining the health aspect of human assets. Supporting livelihoods diversity will be important to achieve this.
Better education	Along with health, education is a key aspect of human capital which gives many people the opportunity to diversify their livelihoods strategies or move out of fisheries when such things as population pressure or depleted stocks are increasing the vulnerability of the communities or groups.
Reduced vulnerability	In many situations, fisheries resource depletion or conflict between fishworkers will be increasing the risks to which people are exposed. Reducing this vulnerability will often be more important that actually increasing income.
More sustainable use of the natural resource base	This is a major concern of fishworkers whether or not they are involved in harvesting, processing or trade. The sustainable use of the resource is the key to many of their capital assets and to many of the other livelihoods outcomes.

Sometimes there can be a conflict between different outcomes. It may be necessary to trade outcomes off against each other or, if possible, to arrive at strategies which are able to enhance all types of outcomes. The priorities of the people themselves will be important in deciding on which outcomes to focus. The SLA is about assisting people to achieve their own livelihoods' goals. However, this must be done without sacrificing sustainability. Fishermen may wish to fish resources in the short-term to the point where biodiversity is severely affected. This would conflict with the sustainability of their livelihoods.

The achievement of desired livelihoods' outcomes is an indicator of the success of the implementation of the SLA. However, many of the outcomes will be difficult to measure with any accuracy and so proxies for these may have to be developed with the communities or groups.

4. COMPARISON BETWEEN THE EAF AND SLA

The EAF and the SLA have at their base sustainable development and this requires that both approaches converge towards a more holistic approach that balances both human and ecological wellbeing. EAF and SLA have much in common, both in terms of what they aim to achieve and the approach they adopt. They both have, as their starting point, sustainable development. While SLA lays emphasis on people and their existing strength and constraints, EAF stresses the conservation and responsible use of the living aquatic resources. Both approaches are people-centred and responsive and also advocate transparent and participatory management. In both approaches, the importance of scientific evidence and the use of traditional knowledge in decision-making is recognized and advocated and the approaches also recognize the dynamic nature of the livelihoods of the stakeholders, the environment and its resources and, in addition, encourage multi-level framework of operations.

There are also differences between the two approaches and some areas where potential conflict might develop. At the strategic level, EAF is more explicitely prescriptive than SLA, in that it defines the ecological constraints required for sustainable fisheries, and these constraints inevitably must prescribe certain ecological and biological limits and thresholds that should not be crossed. The same thresholds will apply in SLA, but they are not emphasized to the same degree. Although holistic, EAF tends to be narrower in perspective, as the emphasis is on the fisheries sector, although it could also be broader if one considered EAF in the broader context of integrated coastal area management. The EAF, unlike SLA, does not try to enhance directly the assets of the SSF workers, nor does it try to influence directly their livelihoods strategies.

The EAF recognizes the importance of the vulnerability context both in terms of degraded environments (resource depletion, habitat loss and pollution) and the conflicts and disputes which can arise. It also recognizes the linkages between poverty, food security and the natural resource base. However, its approach is to address these mainly by improving the transforming policies, institutions and processes of governments and the development and implementation of appropriate fisheries management plans in an ecosystem context, with well oriented management measures and approaches.

EAF emphasizes more than SLA that greater significanc eand attention be given to the precautionary approach when knowledge is limited and risk is high. Furthermore, whereas SLA is formalized by the people themselves at each step of the process, EAF is formalized through the process of elaboration, implementation, monitoring and adoption of EAF management plans.

The overall goal of the SLA is poverty eradication, but poverty is a major threat to EAF. Implementing EAF could add a significant additional burden and the challenges may be particularly formidable in SSF, where the difficulty and costs of the transition to effective management may outweigh the available capacity and short-term economic benefits derived from it. Greater attention would need to be given to developing countries by tailoring EAF to the capacity available, through financial policies (loans) and aid, as well as technical assistance to build long-term national and regional institutional capacity and the rehabilitation of depleted stocks/fisheries.

Table 1 provides a comparison between the SLA, EAF and the FAO Code of Conduct for Responsible Fisheries (Code).

Table 1 - A comparison of the SLA, Code and EAF

	SLA	CCRF	EAF
Goal in relation to target people	Positive outcomes for poor and vulnerable fishworkers. More focussed on the artisanal workers.	Positive outcomes for all workers in the sector. More inclusive, less specific.	Responsible fisheries that do not compromise the multiple needs and desires of present and future generations in the context of the full range of goods and services provided by the aquatic ecosystem.
Immediate objectives	Ensure peoples' wellbeing is sustainable through improvements against the indicators of poverty and vulnerability.	Ensure responsible fisheries through the implementation of UNCLOS and other related international agreements.	Effective conservation, management, and development of fisheries in an ecosystem context.
Principles	Inter-sectoral in nature. More concerned with empowerment aspects.	Sectoral in nature. More concerned with operational aspects of	Inter-sectoral in nature, explicitly recognizes the interdependance between

	Embraces the concept of risk and vulnerability.	fisheries governance.	human and ecosystem wellbeing. Embraces risks and environmental degradation.
Strategies	Lays more emphasis on bottom-up and non-specific. To be led by the SSF workers. More an approach than a toil. Strongly encourages partnership.	More prescriptive. To be largely led by the State but calls for effective stakeholder participation. Highlights norms and standards. More than an approach.	A combination of bottom-up and top-down with greater emphasis on participatory processes.
Entry points	Mainly transforming policies, institutions and processes, and assets.	Mainly transforming policies, institutions and processes in the context of specific areas of fisheries.	Mainly transforming policies, institutions and processes with a focus on natural capital.

5. MAIN ENTRY POINTS OF EAF IN SLA AND OTHER RELEVANCE TO SUSTAINABLE SSF MANAGEMENT

The combined use of SLA and EAF is justified because it is generally felt that SSF workers are among the world's poorest groups and that a common denominator for many of them is vulnerability. The overall goal of the SLA is poverty alleviation, hence, *a priori*, SLA would seem to be an appropriate mechanism to address SSF, particularly so because the EAF and the SLA have much in common, both in terms of what they aim to achieve and the approach they adopt. If properly designed, the SLA offers a way to facilite tailoring and application of the EAF in a manner which support the SSF workers to achieve or improve their sustainable livelihoods.

Likewise the EAF can facilitate the application of the SLA by providing normative guidance on specific issues in specific instances concerned with transforming policies, institutions and processes (PIP) related to the sustainable use of fisheries and aquatic resources. This in turn will allow the policies, institutions and processes to indirectly provide support to avoid or mitigate the adverse effects of the external environment and support livelihoods assets development.

The SLA is inclusive of the elements of the EAF which relate to the livelihoods of SSF workers but goes far beyond it. Nothing in the SLA conflicts with the EAF, but the application of the EAF, outside of the SLA, could be less supportive of the livelihoods of SSF workers. EAF as presently conceived focuses more on fisheries. The inclusion of SLA would facilitate the incorporation of fisheries issues beyond the fisheries sector, by encouraging closer workable and sustainable linkages across sectorial borders.

6. SUGGESTED AREAS OF EMPHASIS TO OPERATIONALIZE EAF AND SLA IN SSF

Taking into account the situation described so far in this paper, it is suggested that the potential areas for research, common to both SLA and EAF, are those related to policy research, that is, the study of policy processes and policy environments, within which the results of technical, production systems, economic and socio-economic research or actions are applied.

The importance of looking at policy is because policies[11] determine, among other things: access to livelihoods, access to livelihood strategies, access to decision-making bodies and sources of influence, the terms of exchange between different types of capital and returns to any given livelihoods strategy. They also have a direct impact upon whether people are able to achieve a feeling of inclusion and well being and they also account for other unexplained differences on the way things are done in different societies. Many modern management strategies have elements of risk of exclusion and marginalization of fishers. EAF *per se*, is not free from that risk. The combined use SLA and EAF could be a way to implement the EAF with limited risk to SSF workers.

---

[11] Policy is understood to be the course of action or a statement in principle of the kinds of actions which a government, an organization or an association, adopts and pursues to accomplish objectives that it has set, taking into account a number of political, social, economic considerations.

Institutions refer to all forms or structures recognized by the law and customs, and hence are complexes of norms and behaviours that persist over time by serving collectively-valued purposes. Institutions are important because these are the organizations, both private and public, that set and implement policy and legislation, deliver services, purchase, trade, and perform all manner of functions that affect livelihoods. Public and socio-professional institutions are governed by the rules defining, as much as possible, the behaviour and responsibilities of its members. Institutions draw their legitimacy from the basic governance framework. Another reason why they are important is because they make processes function. Without legislative bodies, for example, there is no legislation, without courts, or some other informal surveillance mechanism to enforce legislation/regulations, the enactment of such legislation is meaningless. When SSF workers do not have access to organizations of the State, they often have little knowledge of their rights and limited understanding of the way in which a government functions. This disenfranchises them and makes it hard for them to exert pressure for changes in processes that affect their livelihoods.

While institutions can be considered to be the hard structures in the sustainable development framework, processes[12] ensure their functionality and they are important because they grant or deny access to assets, they have a strong influence on inter-personal relationships, that is, how different groups treat each other. Processes also provide incentives and enable people to transform one type of asset into another.

Broad objectives for policy-related research

The broad objective for policy-related research, in addressing SSF in the context of SLA *cum* EAF, would be to better understand:

- the role and effectiveness of policy-making and policy implementation mechanisms (of centralized and decentralized structures);
- how institutions function (particularly traditional institutions);
- processes for the development of appropriate institutions, particularly decentralized ones;
- how both institutions and processes inform policies, and
- impact of globalization and trade on both SLA and EAF.

Suggested areas/themes for research

As a starting point, there is need to undertake an analysis of lessons learned from current practices from the point of view of policy design, and also policy implementation, as they affect SSF. Some key issues that might be addressed to broaden understanding of the subject include:

- What policy making structures exist and how policy is developed.
- How policy implementation processes are optimized.
- Constraints to better transformation of knowledge into policy.
- What are the decision-making processes.
- What is the interface between policy and institutions.
- Extent to which traditional/indigenous knowledge, and information on social and cultural aspects of fisheries systems are used to inform policies.

---

[12] These processes are the series of actions directed towards a particular aim or a series of natural occurrences that produce changes or development and they represent, more or less, the method used by institutions to carry out their work. Put differently, they are the formal and informal practices and rules of the game that determine the structure relationships and make the behaviour of organizations, as well as determining the way in which institutions and individuals operate and interact. Processes are complex and crucial, operate at different levels and may overlap and conflict between them. They are embedded in policies and institutions but also are in the culture and power relationships of societies.

- The extent to which stakeholders are involved in policy formulation and decision-making, including identification of research needs and priorities.
- The changing role of different management institutions, and how best to make the change[13].

Furthermore, since it is important to use various sources of information and also assess the performance of the fishery in achieving its objectives, research on how best to integrate good information from many sources, including both local and scientific information and data, studies on appropriate participatory methods and on what indicators are appropriate in relation to SSF are other primary areas of research to be considered or emphasized.

Strategy to undertake research

In view of the multi-disciplinary nature of the subjects involved, the research would probably be better undertaken by multi-disciplinary teams of scientists/experts, including scientists outside the fisheries sector and local scientists, through case studies. Such work could involve the development of a toolbox of new approaches including rapid appraisal techniques and participatory processes. Annex 1 contains a list of fairly standard and often overlapping participatory tools and techniques that have been used[ref.9] in conflict resolution, integrated resource assessment and management, taking into account political, social and economic perspectives, in the context of SLA framework to uncover the meaning, causes, effects/outcomes, coping mechanisms and strategies adopted by fishing communities to reduce their vulnerability and incidence of poverty.

7. CONCLUSION

The SLA and EAF are potentially useful approaches to accelerate the transition to responsible SSF in an ecosystem context. Combining the two approaches with EAF as a tool to provide guidance for the implementation of the SLA has the benefit of offering a wider base of support to the SSF workers while not compromising their wider conservation, management and sustainable use or ecosystem management issues. The indicative areas for research to facilitate the harmonization of the approaches and the transition to responsible SSF, are those related to policy research, the development of appropriate participatory methods, the elaboration of indicators and processes for integrating good information from different sources in the overall management of SSF in an EAF context. The work would probably be better undertaken by multi-disciplinary teams of scientists through case studies.

It should be recognized that EAF depends on, and complements, conventional fishery management tools, contributing to the best available scientific information and the emergence of the collective political will to implement tough decisions in favour of responsible SSF management. The combined use of EAF and SLA should put effective management of SSF into an ecosystem context, so that local knowledge can be more easily integrated into the process. However, the process will take time, and there will be trials and errors. A great deal of education about this new approach will be required and all involved should be prepared to learn.

---

[13] Preliminary work on some of the themes are on-going under the auspices of the SFLP. See, for example, Anon., 2002. "Rapport des ateliers sous-régionaux sur l'impact des politiques, institutions et processus (PIP) sur les moyens d'existence des communautés des pêches en Afrique de l'ouest, Rapport de Terrain No. 12, 148 pp. Anon. 2001. Étude de l'impact des politiques, institutions et processus (PIP) sur les moyens d'existence des communautés de pêche au Sénégal. Programme pour les Moyens d'Existence Durable dans la Pêche en Afrique de l'Ouest, GCP/INT/735/UK, Rapport de Terrain No. 18, 89 pp. ; and Anon., 2002, The Contribution of Research to the Sustainable Livelihoods of Artisanal Fishing Communities, Sustainable Fisheries Livelihoods Programme in West Africa, GCP/INT/735/UK, Field Report No.14. 49 pp.

REFERENCES

[1] The paper "Ecosystem-based Management of Fisheries, Opportunities and Challenges for Coordination between Marine Regional Fishery Bodies and Regional Seas Conventions", Regional Seas Reports and Studies No. 175, UNEP, 2001, 52 pp. , was presented at the Third Global Meeting of the Regional Seas Conventions organized by UNEP (Monaco, 6-9 November 2000) and the Second Meeting of FAO and Non-FAO Regional Fishery Bodies or Arrangements, organized by FAO (Rome, 20-21 February 2001).

[2] Sinclair and Valdimarsson. 2003. Edited papers from the Rejkjavik Conference have been published under the following reference: Responsible Fisheries in the Marine Ecosystem, Edited by M. Sinclair and G. Valdimarsson. FAO and Cabi Publishing. 2003. 426 pp.

[3] FAO. 2003. FAO Fisheries Department, Fisheries Management. The Ecosystem Approach to Fisheries, FAO Technical Guidelines for Responsible Fisheries. No. 4, Suppl. 2, Rome, FAO 2003, 112pp.

[4] Garcia S.M, Zerbis A., Alhaume C., DoChi T., Lasserre G., The Ecosystem Approach to Fisheries: Issues, Terminology, Principles, Institutional Foundations, Implementation and Outlook. FAO Fisheries Technical Paper, No. 443, Rome, FAO. 2003. 71 pp.

[5] FAO. 2003. Report of the Fourth Session of the (FAO) Advisory Committee on Fisheries Research. Rome, 10-13 December 2002. FAO Fisheries Report No. 699. Rome. FAO. 2003. 25 pp. para. 62.[6] Carney. 1998. After the presentation of the White Paper, there have been a number of publications on SLA. One of the early publications is: Sustainable Rural Livelihoods – What contribution can we make?

[7] FAO. 2002. Report of the Third Session of the Advisory Committee on Fisheries Research (ACFR), Rome, Italy, 5-8 December 2000, FAO Fisheries Report No. 639. 48 pp, paras 17 and 18.

[8] FAO. 2003. Report of the Twenty-fifth Session of the Committee on Fisheries (COFI), Rome, Italy, 24-28 February 2003, paras. 77 and 81.

[9] Satia, B.P., O. Njifonjou and K. Angaman. 2002. Fisheries Co-Management and Poverty Alleviation in the Context of the Sustainable Livelihoods Approach. A Case Study in the Fishing Communities of Aby Lagoon in Côte d'Ivoire. Paper presented at the CECARE organized international workshop. DFID/FAO Sustainable Livelihoods Programme, Cotonou, November 2001.

ANNEX 1

PERTINENT INFORMATION ON TOOLS AND TECHNIQUES THAT COULD BE USED IN ASSESSING VULNERABILITY AND POVERTY IN SMALL-SCALE FISHERIES COMMUNITIES

Tools and Techniques	OBJECTIVES	PARTI-CIPANTS	METHODS	STRENGTHS	WEAKNESSES
Literature Search	Obtain secondary information.	Libraries and institutions.	Search and consultations.	Provides perspectives of the situation.	Information may be very general.
Timelines	Historical view of important events.	Groups of Elders, Youths and women.	Group discussion, interviews and feed-back.	Expedient summary of events (positive and negatives), Helps identify medium and long-term solutions to problems.	Exercise too long and complex, sensitive issues may be raised.
Brainstorming	Gives multiple ideas on issues, problems and solutions.	Groups of elders, youths and women.	Questions and responses on specific issue and summarize results.	Facilitates participation in the idea building process, stimulates people to think, generates ideas and solutions. Useful introduction to structured and focus group discussion.	May result in conflicts and uneasiness in group mat limit value of results.
Venn Diagramme	Identify institutions and their activities as well as relationships.	Socio-professional groups.	Semi-structured interviews.	Easy to use, Provides stakeholders opinion on institutions and identifies conflict situations.	Group may be informal, difficult to appreciate relationships.
Seasonal Calendars	Chronology of activities and preferred Livelihoods strategies.	Socio-professional groups.	Semi-structured interviews.	Encourages a holistic approach, easy to implement.	Brings to surface conflicts between individual and collective strategies.
Trend Analysis	Assess changes over time.	Informants, elders, youths and women.	In-depth discussion of specific issues or phenomena.	Creates awareness of potential positive and negative trends, improves quantity and quality of information, permits comparison of trends.	Relies on memory, tool is complex, local people may loose interest in the subject.
SWOT Analysis	Assess issue of concern, interventions or services; self evaluation.	Groups of elders, youths and women.	Structured brainstorming.	Stresses different sides of an issue, Promotes group creativeness, Issue discussed in detail, Strengths and Weaknesses easy to elicit.	Opportunities and Threats more difficult to elicit, sensitive topics and differences of opinion may arise, tendency by few to dominate.
Validation and Feed-back	Validate and synthesize information.	All groups.	Summarization, discussion and agreement.	Consensus reached, Encourages community attachment to subject.	Minority view may be lost.
Poverty Profiling	Characterization, localization, numeration and description of groups of poor people.	All groups of poor.	Search, semi-structured interviews.	Analytical instruments directly linked to action, provides answers to why people are poor, formulates actions to reduce poverty.	Relies on memory, brings to surface conflicts between individual and collective strategies, some topics too sensitive.

6. IMPROVING THE COLLECTION, ANALYSIS AND DISSEMINATION OF INFORMATION IN SMALL-SCALE FISHERIES

Christopher Ninnes

SUMMARY

This paper considers the evolving "pro-poor" development policy framework, the impact this has on developing country national policy frameworks and how these collectively influence the demands for data and information from fisheries information systems (FIS) in support of small-scale fisheries management.

The translation of new pro-poor policy frameworks and the requirement for policy coherence across sectors provides the context within which sectoral policy for small-scale fisheries operates. To ensure that these policies can be translated coherently has profound implications for the role, responsibilities and functions at all levels of governance, and hence of the supporting FIS.

Many former DOF responsibilities are now being implemented at local government level and DOF needs information to facilitate, support and monitor these transformed roles. In some instances the information requirement will remain the same as when DOF had such responsibilities, the difference is that the responsibility for the collection, analysis and use of this information takes place at the local-government level. In other instances the information requirements are clearly different.

Within the new pro-poor policies the social development aspects of fisheries policy take on a much more important role given the macro-economic focus on poverty reduction. The FIS must have the ability to measure change as a result of the implementation of those policies. This will almost certainly require new types of indicators to be collected by the FIS to measure progress in the sector or to collect information that will allow integration with other information systems that provide sectoral impact on poverty to be measured.

While increasing involvement of resource users in the management of small-scale fisheries are important goals of the changing policy environment, their implications for FIS are also significant. This is clear, given the complexities that there is no one generic approach that can be applied for all potential co-management scenarios. Different approaches will demand that government and the resource user assume different responsibilities for the scale, type and format of information provided in support of management decision-making. Even where all decision-making is delegated to the resource user, government will still have a monitoring mandate to ensure resource sustainability and that poverty agendas are being met.

Before co-management can be effective, strategic consultations need to be held to determine the scope and scale of the management units and of the management arrangements to be established. Despite the commitment to increased community empowerment, many national and sectoral authorities have not engaged in such strategic consultations. This results in ad hoc arrangements becoming established, which may be to the detriment of the long-term sustainability of co-management as a national policy tool to eradicate poverty.

To address the shortcomings identified within many FIS a number of guidelines are proposed that will allow the (re)design process to be placed into the broader national context, as opposed to taking a purely sectoral perspective. These guidelines identify fundamental design characteristics, how to undertake the (re)design process, and how to ensure that both effective and efficient FIS result. The final section of the paper highlights areas where the donor community can assist in implementing these guidelines.

Throughout this paper the use of data and information within fisheries management is considered a process and the use of the term FIS is considered to explicitly represent this process. It is not a short-hand for solutions based on technology only. This process is initiated when an information need

is first identified that is coherent with the macro and sectoral policy framework, continues with the collection of data, its subsequent management and analysis into information, through to its dissemination, communication and use in furthering the fisheries management knowledge base. Annex 1 captures this process diagrammatically.

1. INTRODUCTION

1.1 Document structure

The paper begins with a brief overview of the global importance of the small-scale fisheries sector, followed by a brief summary of past experiences relating to small-scale fisheries management and the more recent responses to address earlier failures. The future requirements for data and information to provide a basis on which to manage small-scale fisheries is then reviewed by considering the evolving "pro-poor" development policy framework and the implications this has for national and sectoral policy frameworks. National and sector policy responses almost always propose solutions based around community empowerment and the co-management of natural resources. The following section briefly considers the complexity of the social, technical and physical attributes of small-scale fisheries and the implications that these have for the requirements and provision of information to support their co-management. The penultimate section summarizes briefly what aspects of small-scale fisheries information systems require change, and how this might be most effectively achieved. The final section presents a summary that identifies key issues and researchable constraints to resolve these issues.

1.2 The importance of small-scale fisheries to employment, food security and income generation

At global and national levels the information base about small-scale fisheries is poorly developed. Despite this, almost all commentators stress the fundamental importance of small-scale fisheries to local economies, livelihoods and food security (see FAO, 2002) but paradoxically there appear few reliable statistics available to substantiate these claims. Briefly summarized below from various sources are data and information outlining the importance of the sector to employment, food security and income generation.

1.2.1 Employment

Pomeroy and Williams (1994) reported that 14-20 million people depend on small-scale fisheries for their livelihoods and that about one billion rely on them for their main source of animal protein. In 2001 FAO estimated that worldwide there were 35 million persons involved in catching and processing of fish, 75-80 percent of which are associated with artisanal and small-scale capture fisheries

However, certain limitations with the data submitted to FAO were highlighted (Coates, 2002). Underestimates were noted for the number of inland capture fishers with FAO estimating a total of 4.5 million globally. From the information available at a workshop to develop new approaches for the improvement of inland capture fishery statistics in the Mekong Basin (Coates, 2002) this estimate was exceeded by employment data from the eight countries represented at the workshop. Although the problems of assessing catches and employment from small-scale inland fisheries are particularly acute, similar problems are also experienced within marine fisheries.

Employment data alone do not capture the true importance of the small-scale sector often because they only record the numbers directly involved in the sector on a full-time basis. This significantly underestimates the numbers dependent on those engaged in the sector either on a full-time or part-time basis. For example, FAO (2001) estimated that employment data for Angola, Namibia, South Africa, Mozambique and Tanzania within the small-scale marine fisheries was 215 000. However, SADC (2002) estimated that 2.3 million people were dependent on these fisheries for their livelihoods.

Meryl Williams of the WorldFish Center estimates that there are at least 50 million women from developing countries employed in the fishing industry (www.futureharvest.org), involved in processing, marketing, gear manufacture and repair, and fishing. No comparable figures for male employment were available.

1.2.2 Food security

FAO provides estimates of per capita consumption of "seafood" from official national figures on catches, imports, exports and sales for animal feed to derive an estimate based on an "whole animal" equivalent. Seafood includes all fish and other aquatic animals from all sources.

The FAO figures range from 15.5 - 90.7 kg/capita/year for all reporting countries. Such averages however mask considerable national variation. Results from consumption studies from the Amazon Basin averaged 27 - 101 kg/person/year in lowland areas, falling as low as 4 kg/person/year in highland areas where beef provides a cheap alternative (Baylee and Petrere, 1989). Consumption studies for the Lower Mekong River Basin (Svendrup-Jensen, 2002 and Hortle and Bush, 2002) have estimated per capita consumption at 36 - 56 kg/year, with the higher estimate being considered conservative by the latter authors. Nouv, Sopha and Sensercivorth (2002) estimated average per capita consumption in central Cambodia at 67kg. These values are considerably higher than annual per capita consumption reported by FAO (2001) for the entire population of Laos (8.5 kg), Viet Nam (11.1 kg), Cambodia (9.0 kg) and Thailand (23.6 kg), which includes marine production.

1.2.3 Income generation

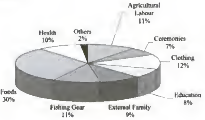
Not only do small-scale fisheries provide employment and food they also provide important financial benefits to fishing communities. The balance made between food and income is both complex and difficult to generalize. The pattern of use of the day's catch is often to take for consumptive requirements *first*, and then sell any excess, although the whole catch may be sold if it is either not easily divisible or is of a species that fishers prefer not to consume at home. This behaviour does not change greatly with prices, and almost the same *amount* will be retained for consumption irrespective of its market value. The proportion retained will obviously vary with catch size (a fixed amount rather than proportion is required to satisfy consumptive needs), but estimates made in coastal communities in Tanzania vary between 10 - 35%. For comparison, in the same communities about 85 percent of agricultural production is consumed rather than sold, evidence that fish provide significant benefits beyond direct consumption by the producer and his/her dependants (RFIS, 2003).

Despite the perception that most small-scale fisheries are exploited for subsistence means only, significant numbers of small markets exist in which fish is traded in almost all developing countries. This suggests that the perception should be challenged. The driving markets include both extensive national markets and increasingly links between artisanal producers and export markets, particularly when high valued species are taken by small-scale fisheries (eg shrimp, lobster).

The degree of dependence on fisheries for cash income in some coastal communities is extremely high. The contribution of fisheries to cash income in Southern African coastal households is estimated as between 40 percent for Mozambique and 55 percent for Tanzania of total cash income. In some communities, this contribution is *ten* times that of the next most significant contributor to cash income.

Cash income is used in coastal communities to gain access to basic services and consumptive needs that are not possible to satisfy through their own resources or effort. These will include food purchases, health and education, clothing, some fishing inputs, agricultural labour etc. An example of household expenditure pattern, sampled from three coastal communities in northern Mozambique, is shown in figure 1.

Figure 1. Household expenditure



This pattern is by no means uniform but irrespective of exactly how the cash is spent, it is clear that fishing is an important cash earner, and that this cash is the key to gaining access to essential services, goods and foods.

Despite the poor information base about small-scale fisheries the data presented above clearly highlights the sector's importance, albeit in not necessarily a complete manner. Therefore, fundamental questions about how many poor people the sector supports, feeds and employs will remain unanswered unless systematic information becomes available at national and regional levels. The answers to such questions are urgently needed by those who formulate national and sectoral policies to ensure that the correct importance is attached to the sector in terms of financial support within national and international donor budgets. Without such information, development activities may focus on other sectors that are assigned incorrect importance, or may even promote sectors that impact negatively on the fisheries sector, particularly in inland sectors when support for agriculture, water extraction, power generation and flood control can significantly impact the resource base. Given that many of those engaged in small-scale fishing represent some of the least empowered and poorest people in society, the inappropriate allocation of resources can further marginalize such people.

To address this fundamental information gap requires developing systems that can capture information highlighting the scale and value of small-scale fisheries at local, district and national levels. Such information is urgently required to influence the pro-poor policy debate and to ensure that adequate resources are earmarked to support and manage the sector and these issues are explored in further detail in this paper.

1.3 Small-scale fisheries: past management experiences and evolving responses

Historically the management of small-scale fisheries is widely recognized as being poor and the resource base of most considered to be exploited at levels beyond which sustainable yields can be achieved. Management approaches have tended to draw on those developed for temperate systems where objectives focus on maximizing resource output using a suite of technical regulations. These approaches are information-intensive, demanding extensive data collection programmes, well developed analytical skills and the capacity to enforce technical regulations.

In developing countries such approaches are hampered because they cannot account for the complex resource, technical and institutional environment within which small-scale fisheries operate. Typically, the resource base is multispecies, exploited by numerous different gear types over a range of habitats and under a variety of institutional and decision-making arrangements. Resource-use patterns are also complex and many fishers may only catch fish on a part-time basis or fish full-time at certain times of the year.

Given these complications management based on temperate approaches has been ineffective resulting in depleted resources, inequity and conflict (Pinkerton, 1989). The failure to manage small-scale fisheries (and other natural resource sectors) is not a new phenomenon, and development policies to address this and other failures continue to evolve. These evolving policies are stimulating policy changes at the national level, which are placing increasing emphasis on poverty reduction, the importance of natural resource management as a coherent component of wider environmental management and the need for changing governance through local government reform and decentralization to effect better management of small-scale fisheries. These reforms place increasing importance on community involvement in the management of small-scale fisheries, and the adoption of co-management, as a component of local government reform and decentralization, is often seen as a "tool" that facilitates and enables the reform process.

Unfortunately, most existing small-scale FIS are poorly adapted to provide the information now demanded as a result of this evolving policy response. Not only were they designed to provide information for inappropriate management frameworks; they do not provide the information now required to address these shortcomings. In many countries, "statistics" are compiled because they are still requested or demanded by central government, even though the actual use to which these statistics are put is often uncertain (Coates, 2002). The systems often still seek to provide the information that would support temperate, single-species stock assessment models (e.g. catch and effort data) despite the poor utility of such approaches. The existing format and national reporting requirements of fisheries information to FAO are also firmly rooted in such approaches.

1.4 Determining information requiring: a strategic approach

In the following two sections this paper firstly considers the fisheries information requirements demanded by the evolving "pro-poor" policy base and secondly what the information requirements are for the development of small-scale fisheries co-management.

These two themes are addressed at a strategic level that seeks to draw out what the future implication for the design of a FIS will be. Emphasis is placed on identifying the role of the institution involved in management at different levels of governance and the type of functions that the FIS will have to fulfil. It is intended that this will provide guidance to the reader as to what needs to change and what needs to be considered when making such changes.

Given the general failure of existing FIS to support the development of successful small-scale fisheries management, such a basic consideration is an essential starting point. The failure to articulate to policy-makers within central governments and the donor community about the true scale and worth of small-scale fisheries to poor people is a major stumbling block that must be overcome before the sector will be given appropriate levels of support.

Because the fisheries sector is but one of many productive sectors that has to respond to higher national objectives articulated within the National Poverty Reduction Strategies (NPRS), the FIS must be able to provide information on the impact the sector is achieving in addressing national objectives concerned with poverty, food security and other development goals. Failure to do so will result in even less resources being allocated to the sector.

As a result of this strategic approach the paper does not provide a prescriptive list of indicators that should be collected or suggestions for "easy to collect" data. The reasons for not doing this are two-fold. The first is because the specific requirements for information are anchored within the national and local level context. The indicators and variables required will be specific to a range of conditions arising from the management framework adopted through to the indicators identified at the national level to monitor poverty within NPRS. The potential diversity of indicators that could be proposed would make listing them not useful reading either because it would be too exhaustive or too simple if summarized. The second and perhaps more important reason is that there is still relatively little known from the literature about what information is being used (at all levels of governance) to inform small-scale fisheries management decision-making.

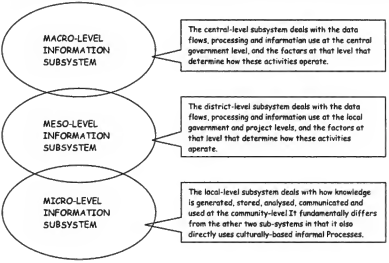
Two ongoing projects the ACP Fish2/Fisheries Management Knowledge Exchange System and the Department for International Development (DFID)/MRAG Data Collection and Sharing Mechanisms for Co-Management, are seeking to provide these details within a two-year time frame. It is not the intention here to pre-empt this work.

2. THE CHANGING POLICY ENVIRONMENT AND ITS IMPLICATIONS FOR SMALL-SCALE FISHERIES INFORMATION SYSTEMS

2.1 Introduction

A FIS is an open system in that it is not self-contained but is linked into wider information systems that deal with issues outside of the sector. As such, it cannot be viewed purely sectorally: it influences and is influenced by a range of policies and institutional arrangements at different levels. These may seem remote from the traditional approaches proposed for small-scale fisheries management but they are nonetheless now vital components of the decision-making processes of the system.

The wider policy change process is resulting in significant institutional reform. This is changing the roles and responsibilities of these institutions and demands different information to feed into new and changed levels of decision-making. A FIS needs to be able to respond to this changing policy framework and requires that more than bio-physical attributes of the resource are incorporated. For instance, national-level planners will want to know how the sector is contributing to poverty alleviation and to improvements in food security. Ideally, a FIS would provide decision-makers at local, district and central levels of governance with appropriate information to enable them to make effective and timely decisions related to their specific functions. This can be represented as shown below:


MACRO-LEVEL INFORMATION SUBSYSTEM
MESO-LEVEL INFORMATION SUBSYSTEM
MICRO-LEVEL INFORMATION SUBSYSTEM

The central-level subsystem deals with the data flows, processing and information use at the central government level, and the factors at that level that determine how these activities operate.

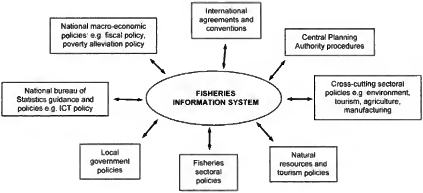
The district-level subsystem deals with the data flows, processing and information use at the local government and project levels, and the factors at that level that determine how these activities operate.

The local-level subsystem deals with how knowledge is generated, stored, analysed, communicated and used at the community-level It fundamentally differs from the other two sub-systems in that it also directly uses culturally-based informal Processes.

There is overlap between these different sub-systems and in some senses the interfaces between them are the most important areas. For instance, the flow of information between the central and district levels will determine how well informed sectoral policy can be developed and subsequently monitored. The interface between the districts the local level sub-systems is particularly important from a governance and service delivery perspective. If small-scale fishing communities are to contribute to, and use, information from the formal system then it is important to understand how they deal with information and how they use it. This is much more determined by local cultural norms than the way information is handled and used in the formal system. Understanding the factors that determine how these communities generate knowledge, store it, analyse it, validate it, and communicate and use it is important to allowing formal and informal systems to mesh.

An important output of a FIS is therefore to provide information that allows the institutional **functions** at all levels of governance to operate effectively and efficiently. Understanding these functions (and hence the information requirements) is a difficult process not least of all because the policy and legislative environment that defines much of "who-does-what" is in a state of change in most developing countries because of the evolution of central government policies. This means that the FIS must also be flexible and adaptive; to balance what is the desired future state of information systems with the practical realities of the change process.

The key policy elements that now influence the design and function of a FIS are summarized in the diagram below. This is not to suggest that the FIS as depicted below formally exists as a defined and separate entity. It is a diffuse set of linkages, data collection activities and information flows across a range of institutions. It is used here as a separate entity only as a short-hand for the complexity of those linkages, activities and flows, to allow that complexity to be better understood.


International agreements and conventions
National macro-economic policies: e.g. fiscal policy, poverty alleviation policy
Central Planning Authority procedures
National bureau of Statistics guidance and policies e.g. ICT policy
FISHERIES INFORMATION SYSTEM
Cross-cutting sectoral policies e.g. environment, tourism, agriculture, manufacturing
Local government policies
Fisheries sectoral policies
Natural resources and tourism policies

The most important of these elements concerning national macro-economic policies, local government reform measures, environmental policy, and fisheries policy and their implication for the design and content of the FIS are considered further in the following subsections. Each subsection concludes with an assessment of the areas where existing FIS need to evolve to address the information gaps created by the changing policy environment.

2.2 National macro-economic policies

The FIS is governed in part by the requirements of the sectoral policies (see below) established by the government department responsible for small-scale fisheries (hereinafter referred to as Department of Fisheries (DOF)). These are subservient and should be coherent with national development policies, and collectively provide the framework, priorities and context for the FIS.

Recently, and in order to give strategic direction to attaining these national development policies, the adoption of National Poverty Reduction Strategies (NPRS) are being increasingly used. Since 1999, NPRS provide the basis for World Bank (WB) and International Monetary Fund (IMF) lending and for debt relief under the enhanced Heavily Indebted Poor Countries (HIPC) Initiative and are increasingly being adapted by developing countries.

Poverty reduction and community empowerment are usually principle development aims within a relatively hard budget constraint of most NPRS. They also recognize the dependence of many of the poor on natural resources and the potential for increased environmental degradation and environmental and natural resources (NR) management are high on the agenda. The implications of this policy framework for the FIS are as follows:

- The over-arching policy objective for most developing countries is a tight fiscal balance. DOF through the small-scale fisheries sector may have a role to play in this through generating royalty and tax receipts, although such revenue generation is more commonly associated with the licensing of larger vessels and the charging of export levies. Revenue is collected indirectly from small-scale fisheries when charges are levied on products passing through local markets and such charges are likely to play a growing role in local government revenue-generation as they seek to generate an increasing proportion of their financing locally.
- Tight fiscal balance also means that budget and staff allocations to the FIS are not going to be significantly increased in the medium term. Any changes to the current FIS will most likely need to be done within the current staff and other resource capacities. Under such constraints the development of the FIS will need to balance the cost of data collection and analysis, with the value generated through its use.

- The social development aspects of fisheries policy take on a much more important role given the macro-economic focus on poverty reduction. The ability to measure change as a result of the implementation of those policies will have implications for the type of indicators used to measure progress in the sector and for how those indicators are measured.
- It is likely that key indicators and variables have been identified as part of the NPRS process. If the fisheries sector was not specifically involved in the development of these (as is often the case) their utility may be limited. If they are not suitable they should at least provide guidance for the identification of alternative indicators that will be coherent with the wider national information system.
- Often the status and contribution that small-scale fisheries are accredited within NPRS undervalues their true worth compounding the problems that inadequate national budget allocations have caused. Fortunately, NPRS are considered to be "live" documents, requiring updating when new information becomes available. As such, they are a vital target for the dissemination of information derived from improved FIS by sectoral policy-makers.

2.3 Local government reform measures

In line with the aims of poverty reduction and improved governance, many central governments are implementing a reform process that promotes decentralization, incorporating greater responsibility for local government in service delivery and participation of the community in decision-making processes. This reform process requires major changes in the roles and responsibilities of sector ministries, DOF and local authorities.

Local governments are increasingly being given responsibility for social development and public service provision within their jurisdiction, the facilitation of maintenance of law and order and issues of national importance such as education, health, water, roads and agriculture. Decentralization of government involves four main policy areas: political decentralization; financial decentralization; administrative decentralization; and, those governing the need for change in central-local relations.

Most of the responsibility for implementing sectoral management now rests with local authorities with DOF providing policy, legislative and standard setting guidelines and capacity building. The role of DOF is therefore evolving into:

- Sectoral policy developing bodies.
- Supportive and capacity building bodies.
- Monitoring and quality assurance bodies within the local government legislative framework.
- Regulating bodies.

The relationship between central-sector ministries and local authorities is now one characterized by consultations and negotiations, support from ministries to local governments supplemented with regulation and legal supervision of local government political and administrative decisions. The role of central government institutions will be reoriented towards:

- Facilitation and enabling of local governments in their service provision.
- Development and management of a policy and regulatory framework.
- Monitoring the accountability of local government authorities.
- Financial and performance audit.
- Provision of grants.

The changing roles of sector ministries and local government authorities which have significant implications for the FIS are as follows:

- A key role of DOF as a result of these local government reforms will be to provide guidance on the implementation of sector policy through local government plans and service delivery mechanisms. This will require translating fisheries sector policies into guidance that is of direct use by the local government authorities in their planning processes. It will also require capacity building by DOF at the local level..

- Likewise DOF will need to provide guidance to local authorities on sector legislation and its implications for by-law production and enforcement.
- DOF will also be responsible for monitoring and evaluating sectoral performance (from both socio-economic and biophysical perspectives) at the local level and through centrally organized programmes. This has implications for baseline studies that will need to be designed and implemented and possibly for subsequent sampling programmes for resources of significant national importance. It also requires DOF to actively develop a role to inform and influence local development plans that impact upon the fisheries resources and upon the livelihoods of fishers, and on measuring that impact. An important role of DOF will be to ensure that social and environmental indicators for measuring change, and that the systems for monitoring those indicators exist and are harmonized with other systems within local, district and central government. There are also important implications for DOF in assessing and improving sector-related capacity (including monitoring and evaluating plan implementation) at the local level.
- Another key role for DOF will be the development and dissemination of sector specific guidelines, to allow participation in the processes of governance and development related to the sector. This process will need to be tailored to the specific needs and capacities of the different audiences concerned. DOF will also need to ensure consistent application of those guidelines.

2.4 Environment policy

The wider environmental policy framework typically identifies natural resource use and broader environmental management as important and complimentary elements in its strategy to eradicate poverty. There are two linked elements: the first is to satisfy basic needs; and, the second is to protect the environment in the cause of development. This two pronged approach also needs to be reflected in the fisheries policy to ensure effective management of both the use of small-scale fisheries resources exploited by the rural poor and of the associated aquatic environment. This approach is essential to ensure the sustainable reduction in poverty for those dependent on small-scale fisheries resources for their livelihoods.

Small-scale fisheries are sensitive to the impacts caused by other sectors, and to ensure effective resource-use and environmental management requires effective co-ordination across a range of institutions and sectors and clarity of mandate. Inland waters can be particularly strongly impacted by external events and these can exceed the impacts associated with fisheries extraction. Because of their potential magnitude they also make proportioning resource impact and determining that associated with fishing difficult. Although coastal marine waters are generally less sensitive, small-scale fisheries associated with critical and sensitive habitats, such as coral reefs and seagrass beds, are also vulnerable to external impacts.

Small-scale fisheries may target or take as a by-catch endangered species or species with a high conservation appeal. Such issues and the need to deal with small-scale fisheries management within a wider, holistic approach to environmental management are becoming widely recognized. Although ecosystem-based approaches based on the boundaries delimited by Large Marine Ecosystems (LME) or watersheds provide a framework within which to address such issues, ecosystem management is rarely approached from a pro-poor, livelihoods based perspective and concerns about environmental monitoring and the impacts of these (and fisheries) on the resource base predominate. Ecosystem-based approaches will need to develop a more people-focused approach as the basis for their intervention before they can become useful policy instruments to eradicate poverty.

The incorporation of wider environmental objectives within sectoral policies must be done within the human and financial constraints imposed by the wider policy framework. An effective approach will be raising awareness about environmental issues and sustainable resource use among the poor so that they are able to more effectively participate in resource management efforts.

The implications of environmental policy on the FIS are:

- The mainstreaming of environmental policy within fisheries sector policy implementation is a logical extension of resource and ecosystem management and in most instances will not require significant changes. What will require effort will be the re-packaging of environmental awareness-raising messages into context useful for local government staff and communities.
- A key role at central government level, which will largely depend on establishing formal (and informal) networks with other sector agencies, will be for DOF to ensure that information on the importance of the small-scale fisheries sector and its vulnerability to external impacts is disseminated. This may be facilitated through the central environment agency or may require the lead of DOF. Networks established between central agencies also need translating into strategies and activities at the local government level.
- There is also a role for the FIS in informing resource users about the importance of sustainably using aquatic resources and about the role they can play in resource management. This needs to be done through both formal education services and through community-level institutions. Close collaboration with the central authority responsible for the environment will be essential to ensure coherence of approaches and DOF can clearly take the lead to coordinate at central levels, and package appropriate information for use by local government staff.

2.5 The Fisheries Information System (FIS) in the sectoral context

The FIS operates at the fisheries sectoral-level to inform on policy, and to guide and monitor the implementation of policy.

2.5.1 Informing policy

The two key aims of small-scale fisheries policy are typically focussed on the sustainable use of the resources and on development. This policy provides an implementation framework for local government activities and it is the responsibility of the DOF to ensure that local development plans conform to this.

The progressive shift in focus of wider macro-economic policies towards poverty reduction and the development of sector policies that are coherent and subservient to that aim, has meant that the relative balance of the two strands of fisheries policy are beginning to change. Much greater emphasis is now (correctly) placed on sectoral policies to achieve poverty reduction as part of wider sustainable development. In parallel with these two key policy threads is often that of maintaining fiscal balance within the sector, and this constitutes an important activity of central and local government authorities. Linked into this is the desire for greater involvement of rural communities in contributing to and evolving policy.

2.5.2 Implementing policy

Information is required to guide and monitor the implementation of sectoral policy. Not only in relation to the sector policy aims of sustainable use of resources and development, but also possibly to fiscal policy in relation to revenue generation (albeit as previously noted usually directed towards licensing and export levies at the level of DOF).

Policy is implemented through a series of instruments:

- Direct interventions by the DOF.
- Collaborative interventions with the local government.
- Externally funded projects.
- Legislation.
- Networking and partnerships with other agencies and fishing communities.
- Information dissemination.
- Licences, taxes, levies, etc.

Both the DOF and local government require information to plan their respective and joint interventions, as do externally funded projects. Information is also required on the effectiveness and impact of such interventions to influence future polices and plans. Legislation is used to enforce policy, and information is needed both to formulate legislation and to ensure its application. Legislation is also constantly being revised to reflect new emerging national policy and this will have implications for information needs.

Policy is also implemented through information dissemination aimed at changing the behaviour of others. A key role of this is informing and influencing the activities of local government bodies and of other government departments, not only in the formulation of their policies but also in how those policies are implemented.

The policy changes previously described are significantly changing the roles and responsibilities of DOF and local government and these changes are also reflected in the information requirements as highlighted below:

- Local government reform means that the direct intervention role of the DOF in development and resource management has reduced. This means that the informing and influencing role of DOF has become one of the key policy instruments to influence the behaviour of both the local government process and the community in the implementation of, and adherence to, the fisheries policy.
- Often, decentralization also results in local-level DOF staff, who were former employees of central government, becoming financially and administratively controlled by local government. The separation of these local-level staff means that the control and direction of their technical activities by DOF has become more difficult. This means that both data collection on the development of the sector and the impact of policies is organized more indirectly.
- The increasing operation of many donor-funded projects through local government structures now means that DOF is more remote from these activities and new ways of monitoring their progress and impact need to be developed.
- The need to promote greater involvement of communities in the development of policy and its implementation means that new approaches to engaging communities in this process need to be facilitated and supported by the FIS.
- The continued emphasis on fiscal balance means that revenue generation will remain important. At the DOF level these are likely to arise from exports and vessel licensing and are necessary to fund increases in the support that DOF can provide for service delivery, management and development. At the local government level revenue generation will increasingly look to the productive sectors under its control, and revenue levied on fish products passing through local markets will likely be increasingly targeted.

3. CO-MANAGEMENT AND THE IMPLICATIONS FOR SMALL-SCALE FISHERIES INFORMATION SYSTEMS

This section considers the implementation of macrolevel policies at the local level and the implications for the FIS. Within the context of the changing policy environment to reduce poverty, community empowerment is widely promoted. The greater involvement of communities in decision-making in collaboration with local and central government is referred to as "co-management".

Although fisheries co-management is widely advocated, experience to date would suggest that its successful implementation on larger geographic scales is relatively unusual. In this section the paper argues that one of the contributing factors is that rarely co-management is promoted in a systematic manner that would support its wider uptake. The complexity of the potential management arrangements, the geographic scale on which they may have to be implemented and the changing roles for the provision of information to support small-scale fisheries management decision-making, are all important issues that require careful planning. Each of these issues has important implications for the

FIS that will support co-management decision-making and these are explored in the following sections.

The complexity of the range of co-management arrangements that is presented would seem to suggest that there are no simple and generic approaches that are possible to adopt. While this is unlikely to be the case, the issues raised do point to the need for some caution in assuming that co-management as widely advocated is suitable in all circumstances, and that its successful adoption will be straightforward. The previously noted on-going research seeks to specifically draw out such generic lessons and developing best practices, and it would be wrong to pre-empt these results at this stage.

Finally, it is worth emphasizing that for the participants in co-management the benefits need not necessarily only relate to improvements in catches. Benefits derived from improvements in communication among users and between users and government, through the sharing of experience and competence and because of a greater sense of being heard, can all be significant attributes of empowerment.

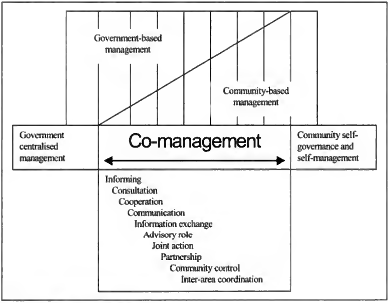


Figure 2. A Typology of Co-management.

3.1 Co-management

The term "co-management" evolved from the rural development debate of the late 1970's to reflect greater emphasis on government/resource-user relations. Its uptake as a policy instrument in both the developing and developed world scenarios has become widespread (Pomeroy and Williams, 1994; Pomeroy, 1995 and Phillipson, 1996).

Sen and Nielson (1996) provided a useful typology of co-management based on the level and mode of communication between government and resource users (Figure 2). A spectrum exists between paternalistic "instructive" arrangements, with minimal exchange of information between government and user, to "informative" arrangements whereby users are delegated decision-making power but inform government of change. Within this graduation Sen and Nielson identify a "co-operative" mid point as a desirable goal and define fisheries co-management as:

"..an arrangement where responsibility for resource management is shared between the government and user group."

The range of potential relationships between government and resource user will be reflected in differences in institutional arrangements, user participation, political will and ultimately the desirability of partnership. The constraints to achieving co-management in small-scale fisheries will also be anchored within the current and historic nature of government and community institutions and its implementation will require new roles to be learned. The graduation also highlights the range of management interactions that might be found and these will differ from country to country and even between fisheries or management unit (Hoggarth, Cowan *et al.*, 1999). As such it also highlights the differing responsibilities for the provision of information, with "instructive" arrangements relying almost totally on government sources, and "informative" arrangements relying more on community sources.

3.2 Conditions to be met for successful co-management

Pomeroy and Williams (1994) identified certain conditions central to developing and sustaining successful co-management:

- Clearly defined boundaries.
- Membership is clearly defined.
- Group cohesion.
- Organizational capacity exists.
- Benefits of participation must exceed costs.
- Individuals affected by management arrangements are represented in decision-making.
- Management rules are enforceable by resource users.
- Legal frameworks exist that give users ownership over resources and authority to make management decisions.
- Cooperation and leadership at the community level exist.
- Decentralization and delegation of authority.
- Coordination between government and local community.

Each of these conditions has implications for the design and operation of a supporting FIS since each has an information need that must be addressed to achieve successful co-management.

3.3 The complexity of small-scale fisheries and implications for co-management

The physical, technical and social attributes of small-scale fisheries are complex and differ. These attributes will in part determine which type of co-management arrangement can be implemented and for the type and provision of information that is required to support them.

When clearly-defined physical boundaries exist for a water body that also contain or have some biological significance for the exploited resource, then these may also serve as the boundaries for an effective management unit. Small lakes and reservoirs can usually be delimited as a single management unit. For larger water bodies that contain sessile species or species with limited "home ranges" a number of largely independent management units can be envisaged. Management units that can be clearly defined have the advantage that the resource users know who should be extracting the resource, and enforcement measures can be encouraged through peer pressure and local surveillance.

When the physical boundary of the water body or the ranges of the species to be managed are extensive (e.g. for species with large distributions either as the result of adult or larval mobility or for migratory stocks) the management unit will need to be subdivided into a number of smaller but linked subdivisions. This ensures that all resource users can be represented and that all potential impacts can be mitigated within a single consistent management arrangement. A management unit may need to include a number of administrative subdivisions to ensure that users from different villages, districts, regions or even countries are represented. This typically involves establishing nested hierarchal decision-making arrangements that can function both vertically and horizontally. The need for such management arrangements to function in two dimensions applies equally to the group and social cohesion characteristics necessary to make the system work, as it does to the flows of information required to support the decision-making. It should also be noted that information will originate from both the resource user and from government and hence will need to flow downwards and upwards through the nested decision-making arrangements.

The increasing complexity of nested and hierarchal management arrangements will obviously increase the transaction costs of management participation and, for co-management to be successfulthese costs must not exceed the benefits of management. Large management units complicate defining and enforcing membership but also complicate determining the "benefits" derived from co-management. Fisheries management (of overexploited resources) requires forgoing potential harvest for future benefit. The larger the management unit the more difficult it will be for resource users to appreciate the benefits of the management intervention. This in effect discounts the perceived benefits, which will create incentives to ignore management regulation. In situations where the resource user cannot easily perceive the cause and effect of management intervention, the role of information dissemination becomes even more important to promote necessary transparency and support-group cohesion.

Many co-management initiatives are undertaken on relatively small-scales, often supported with donor funding to establish the institutional basis for management. However, as previously noted co-management will require, in many instances, nested and hierarchal decision-making arrangements.

Management on larger scales can only be achieved when there is systematic support from central and local government. This must include prioritizing of the fisheries to be co-managed and determining the types of co-management arrangements that should be applied. This will then allow the information needs to support management decision-making to be identified and prioritized, as well as establishing clear mandates as to who will provide this information. Such approaches are often absent from many small ad hoc initiatives and they fail to address the basic conditions that must be met before co-management can be successful.

Water bodies that also suffer from significant non-fisheries impacts present further challenges to establishing the cause and effect of management intervention. Fisheries regulations to conserve migratory fish catches will have no beneficial impact if critical spawning habitat is lost or if migratory pathways are blocked through the development of flood relief schemes. For management to be successful it must encompass all potential impacting sectors, although this again raises the transaction costs of management.

Inland flood plain fisheries present additional constraints to establishing successful co-management. The seasonal floods, which inundate the highly productive floodplains, significantly increase both the area available to fishing and the range of stakeholders that become engaged in fishing activity. The sheer complexity and scale of these (and perhaps other) fisheries may mean that the transaction costs of co-management (based on technical regulations concerning species or catch limitations) will exceed the benefits. In such circumstances simpler management arrangements will be required, perhaps based around the protection of critical habitats and migratory routes. Such approaches would still involve co-management but would remove the requirement to base these on the control of catches directly.

3.4 Co-management and the provision of information

Within many co-management arrangements increased responsibility for information provision in support of decision-making lies with the resource user. For small and self contained management units such information can use community-based informal processes. For larger and more complicated management units informally derived information will need to enter the formal FIS, and it is often assumed that this information can be collated in a meaningful way to support hierarchal and nested decision-making. It is also often assumed that all information in support of co-management decision-making will be derived from local users and the role of government as a provider of information has been completely devolved.

It is necessary to question these assumptions. Not least because the types of information that will be used by resource users in local decision-making may not be usefully collated, it may be simply in the wrong form or of the wrong type to be useful at higher levels. In addition, the transaction costs of information collection cannot be underestimated, particularly if they are required in a formal format rather than in the informal and culturally sensitive manner that local resource users may collect and use information. However, more fundamental to the co-management equation is that government authorities must retain some responsibility for information gathering and information provision.

Depending on the co-management arrangement either central or local government will retain a responsibility to higher authorities for the good governance of the resource base and fishery. This will require some level of independent monitoring and the results of such analyses can usefully feed into the management decision-making. This does not necessarily demand independent data collection, although this may be necessary.

The responsibility for the provision of information by government authorities to support the management framework will also increase the closer the co-management arrangement lies to left hand scale of Berkes' typology. Central government will also have an important role to play in the provision of information to support co-management capacity building.

It is also suggested here that with increasing scale and complexity of the management unit there will be an increasing role for government in the management arrangements and hence an increasing dependence for government to provide the necessary information to support this.

4. SMALL-SCALE FISHERIES INFORMATION SYSTEMS: WHAT NEEDS TO CHANGE

For DOF the role of information as a policy instrument for small-scale fisheries has dramatically changed with the changing "pro-poor" policy environment, particularly if this incorporates agendas considering community empowerment and local government reform. This role requires the specific targeting of information to influence the behaviour of people at the community level, local authority level, donor level, and in other sector ministries and central government agencies. This has in many ways, rightly, become the main substitute for direct action by DOF. Conversely local governments have now assumed many of the direct responsibilities for resource management formerly undertaken by DOF.

It is clear that the FIS of most developing countries have not yet evolved to take on this role and many key elements of existing systems were designed to address information needs that have changed substantially. The emphasis is still on data collection and analyses that support inappropriate management approaches with the resultant information being mainly used to (inadequately) inform at higher levels of government.

Unless existing FIS are rationlized the increasing demands for information on DOF and local government arising as a result of the changing policy environment will cease to function.

To guide the rationalization of current FIS three key (re) design elements are proposed:

- a number of fundamental design characteristics must be incorporated;
- the redesign of existing or design of new FIS must make best use of existing information systems; and
- each piece of information within the system must be clearly identified as needed and capable of being used.

These design elements are further explored below.

4.1 Fundamental design characteristics for fisheries information systems

A FIS should incorporate the following design characteristics:

- Be **effective** such that it responds to the needs of wider national and sectoral policy and **efficient** in that it collects and collates a minimum set of information that optimizes the DOF's ability to implement, monitor and develop that policy. The FIS should ideally aim to reduce the workload of DOF staff while at the same time increasing their ability to do work more directly related to the implementation of national and fisheries policy. Collectively, these approaches should reduce workloads, produce better outputs and increase the impact of the work produced.

- The FIS must be **impact oriented**. There is no point in collecting, analysing and disseminating information unless it contributes to the sector's role in meeting national development objectives through the implementation of sector policy. Similarly, improving the efficiency of an existing system will be of little value unless it is having the desired impact. FIS also require continuous evaluation to eliminate information processes that do not contribute to impact, and to identify gaps where additional information is required. Without this, the information system is likely to grow in size and swamp those working in it.
- Be **flexible** to accommodate the future requirements of the evolving policy framework at the national level and the changing development and service delivery environment at the local government level.
- Incorporate an **informing and influencing strategy** for DOF that reaches across, and harmonizes the activities of all its component units. This should contribute to prioritizing information needs and with the way information is packaged and disseminated to the diversity of stakeholder groups that DOF wishes to influence. Such a strategy is required because different people make different types of decision at different levels of the systems and require information in different forms to do it.

4.2 Redesigning fisheries information systems

When considering what changes need to be made to FIS, a number of fundamental steps are proposed below that will result in the design of a system with increased effectiveness and efficiency.

- **Review the current information systems.** An essential starting point in the design of an improved FIS will be to review the existing system, based upon an impartial (desk-top) appraisal. The review should consider what the FIS currently does and what it should do to contribute to policy achievement in three key areas; social development, sustainable use of resources and fiscal balance. This will invariably involve a greater emphasis on socio-economic data collection and analysis to address the social development aspects of fisheries. This process should include reviewing the current system's effectiveness and efficiency in:
    - assessing and monitoring the small-scale fisheries sector's contribution to achieving nationally-set objectives;
    - the provision of information in support of local government reform and the implementation of co-management or other management arrangement;
    - the information flows between other sectoral agencies at central and local government levels;
    - the provision of information to regional bodies and in compliance with international agreements and conventions;
    - assess where there are gaps and inadequacies in the above; and
    - review if any of these gaps can be met from information contained in other information systems.
- **Build on the existing FIS.** In planning for the implementation of an improved fisheries information system it must be recognized that almost all countries will have some form of system in place, commensurate to the resources available to implement it. Modifications to this system should not seek to replace what exists as an initial starting point, but rather to build on its existing strengths. Countries with extensive FIS should consider how best to improve them, without incurring additional costs, by considering how to make the system more effective and efficient.
- **Integrate the FIS with other IS.** It must also be recognized that a FIS is but a subsystem of a national information system. The review of the FIS should also review the broader national

statistical framework, including their linkages and how they respond to nationally-set development priorities and objectives. The FIS should be reviewed, revised or developed with the full involvement of other government agencies collecting data. FIS should be designed to make it easier to incorporate information generated from other systems and ensure that sector information generated by the FIS can be more widely incorporated in other national systems.

- **Agricultural surveys.** In many developing countries there is often a commitment to undertake periodic population census, which in turn provides a frame of agricultural households for an agricultural census. The importance and the information requirements of small-scale fisheries are often poorly recognized by national statistics offices as well as by core statistics units of ministries of agriculture. Crispoldi (2002) outlines how, with appropriate and limited modifications, population and agricultural census can be used to collect information on small-scale fisheries.

The integration of FIS with other information systems and the relevance of making best use of agricultural surveys are important for two reasons. Firstly, since the sustainability of many government statistics programmes is threatened by resource shortages, best use of available resources should be made to collect cross-sectoral data. Secondly, because rural communities are not "sectorally bound" and follow diverse livelihood strategies, often encompassing agriculture and fisheries production the integration of information gathering is a logical extension.

4.3 Information need and use

For any FIS there are a number of key attributes associated with the information it contains for the system to be both effective and efficient. These information attributes can be considered under the headings of; information need, data collection, data and information management, data analysis, and information dissemination and use (see Annex 1). These issues are considered further below:

- **Information Need.** Since the collection and analysis of fisheries data is costly and time-consuming, the needs and objectives for collecting particular information within the systems must be clear to all involved in the process. The identification of what information is needed should be driven by the decision-maker and not on the assumption of what is perceived to be needed by the manager or other technical staff. Too many FIS are populated with detailed technical information that does not address the key questions to be answered. To help identify what information needs to be collected three steps are proposed:
    - ***Its relevance to the user***: It needs to be relevant to the problem being considered at the level at which it is being considered, e.g. providing information to rural communities about the contribution of the sector to GDP is unlikely to be very relevant.
    - ***Prioritized***. Ideally all the information necessary to make a decision should be available but this is rarely possible. Information needs must be prioritized.
    - ***Its confidence limits***. Decision-makers and information users need to be confident that the information has the attributes that is claimed for it.
- **The collection of data and information.** Collecting data and information is costly and time-consuming. How this is done, where and when are all critical issues that must be addressed when designing a collection programme. Data collection is usually undertaken for one of three reasons: to establish a baseline; to assess trends; or to address a specific information gap through research.
    - Baselines are either one of studies or are undertaken at intervals spanning one to ten years. They are expensive and are usually designed to establish the exact magnitude of national fisheries (e.g. through enumerating numbers of vessels, gears and fishers), to obtain essential livelihood information on the social and economic well being of fishers or to establish the absolute magnitude of a resource for valuation of a fishery. Such baseline information are often used to establish subsequent statistically-rigorous sampling frames that may allow aquatic habitat to be divided into strata according to

ecological, fishery or social characteristics, the identification of sampling locations that are typical of the various strata and from which sampling frequencies can be determined.

Trend analysis to monitor the impacts of policy and management decisions and their impacts on the fishery can be collected either directly or indirectly. For instance, data on total catches can be determined directly by recording the actual catches made by fishers, usually using a frame-based sampling programme. Indirect methods of recording catch require additional information to determine catch (e.g. recording landings at designated sites requires information on catch retained for personnel consumption or on discards; recording flows of products through markets will require information on product conversion ratios for processed fish and on where the product was derived from to avoid "double counting" of product passing through a succession of markets; household surveys that record fish consumption will require information on the type and proportion of the catch retained and of the volume by species sold).

The more spatially and temporally diverse and complex the small-scale fishery is the more unlikely that direct measurements will be cost-effective and hence appropriate. Indirect strategies will inevitably require a degree of stakeholder participation to enable the information collected to be extrapolated.

  - Research studies address specific gaps in the information base. Detailed information may be needed to support management decision-making based on the research into the social and economic circumstances of the fishers and their families, to define details of the biology and ecology of the resource base, and marketing patterns or conservation needs.

Whatever the reason and method chosen there are a number of guiding principles that will ensure that the data or information collected will address the decision-making need.

  - By defining a **common set of protocols:** developed in consultation with the stakeholders of the FIS, that define the standards and methods for the way data is collected will improve the complementarity of data derived from different sources and thus their combined value.
  - Data collection programmes need the right **degree of coverage.** Not all information requirements demand complete coverage and sample-based methods should be employed. Coverage should ensure that accurate decisions can be made for the purpose to which it will be used. Levels of coverage will be closely linked to the cost of collecting data and information. There is little point in DOF or local government striving for a very high level of coverage of certain information areas if the costs of achieving this far outweigh the benefits.
  - Make best use of **existing data.** Before determining what coverage is needed, and particularly in data-poor situations, small-scale data collection programmes often exist (e.g. associated with donor projects) that can provide partial needs or guidance on the design of a larger programme.
  - **The role of women.** A significant number of women are involved in small-scale fisheries activities, (e.g. in China women account for 26.3 percent of the rural labour force in fisheries) and their role is often different from that of men. In some societies women are involved in processing and marketing, catching and gathering for household nutrition (on a year-round basis as opposed to seasonal inputs from men) and increasingly in fishing, with increasing single parent households. Therefore they are a source of information that augments and complements that derived from men.

- **Data and information management.** Despite undertaking expensive data and information-collection programmes the management of the original data is usually poorly organized. The absence of proper archiving and referencing, through the use of metadata, results in limited use often being made of data sets that are extremely expensive to collect. This is particularly so for short-lived "institutions" such as donor-funded projects that often collect much detailed baseline and trend information but which are lost through inappropriate planning for long-term data management. Projects and government departments also produce many reports not represented within the formal literature. This "grey-literature" provides a wealth of information that would contribute to wider fisheries management decision-making but because of its poor documentation and cataloguing its long-term contribution to the information base is diminished.

- **Data analysis.** Data are of little use unless they are analysed to become information. Training to provide analytical skills is expensive, and the human capacity to undertake such work is often limited. When identifying information needs, recognition of how and by whom they are to be analysed must be considered.

It has been previously noted that single-species approaches to assessing fisheries yields are inappropriate for most small-scale fisheries, particularly those from complex tropical ecosystems. Alternative approaches need to be developed and tested through their application within fisheries co-management. Welcomme (2002) proposed a multi-species model that seeks to predict the behaviour of complex assemblies of fish when subject to fishing and environmental pressure. The model shows a yield that is sustained for a considerable range of effort, although the curve hides a series of changes to the fish community in that successively smaller species (or individuals) replace the larger ones. The example is taken for an inland fishery but could equally apply to many tropical marine fisheries. The model is relative in that it does not predict the absolute level of sustainable yield but traces the health of the fish assemblage by observing changes in certain characteristics. These characteristics are relatively simple to obtain and good indicators as to the health of the fishery for complex assemblages can be undertaken on the basis of understanding mean length, size at maturity and the presence/absence of key indicator species. Associated options for the management of these resources, and to limit species extinctions, is to focus on reducing (critical) habitat destruction, especially breeding grounds, to offer protection through closed areas or seasons to ensure escapement, and to maintain essential ecological and biological functions of the ecosystem. There is therefore little attempt to manage individual species or to introduce species (or group) specific regulations. This will significantly reduce the traditional requirements for fisheries information, but will demand different data requirements (or at least more emphasis on certain types of data).

Such approaches are not without their limitations but it is only with their application (and future development) within small-scale fisheries can their utility be assessed.

- **Information dissemination and use.** A common failure of FIS is their inability to get the information that has been collected to the right people in the right form. As noted, data are of little use unless they are analysed to become information. However, analysis alone does not determine whether the resulting information will be used. For information use to be effective it must reach the right target audience, and to be efficient it must communicate in a manner appropriate for that audience. This will require the "packaging" of the same information into different formats for different audiences. A FIS must therefore ensure that information is:
    - **Available to the right people**. Often information exists but people do not know it exists. This differentiates real from apparent information gaps. Wider national information systems tend to be complex with many agencies monitoring or measuring different aspects of the economy for different reasons. Much effort can be saved if this information is shared and made available to the people who can use it.
    - **Timely**. Information needs to reach the right people at the right time for them to make decisions.
    - **Useable**. The form that information takes often determines its accessibility to the decision-maker. Reports in formal language may be acceptable by senior government staff but are unlikely to have any impact on members of rural communities. Detailed reports, full of technical information, may be useful to field practitioners but will be too long for policy-makers whose time is short. Getting the right method to communicate with the intended audience in an understandable way is vital for information to be taken up and used.

Many national, regional and international institutes generate information relevant to fisheries management decision-making, often generated as a result of regularly commissioned research or through outputs derived from externally funded projects. Much of this information has been deposited within the formal information systems of the world's libraries that can contribute to knowledge outside of the particular geographic area the information was generated from. Reuse of such information provided in the literature may make valuable contributions when there are gaps in the local knowledge base.

5. HOW CAN FAO AND OTHER DONORS HELP?

Building on the findings presented in the earlier sections, a number of priority areas for research and support have been identified and are outlined below:

5.1 Assessing the scope and scale of the contribution of small-scale fisheries to poverty reduction and food security

- As an urgent priority most developing countries need to undertake a rapid assessment to establish the importance of their small-scale fisheries. An initial desktop assessment using available secondary information, including that collected by donor-funded projects, should be undertaken. This will provide initial best estimates of the magnitude of the fisheries. This review will also identify the need and appropriateness of undertaking further baseline and other studies that will feed into the studies identified below.
- Linked to the above study is an urgent need to also review the context and importance attached to small-scale fisheries in NPRS and other medium-term planning documents. Based on the correlation between the desktop study and the coverage in planning documents, an informing and influencing strategy may need to be developed to increase the profile of the sector.

5.2 Designing responsive fisheries information systems

- Work with DOF to review their FIS (in the broader context as an element of the national information system) and define the key elements of the FIS that must be revised to produce a system that supports national poverty reduction objectives.
- Work with DOF to define socio-economic and biophysical indicators for monitoring local government plan implementation and to build on existing data collection and analysis processes to cost-effectively monitor impacts. Linkages should be established with central planning authorities who coordinate much of these monitoring activities.
- In developing the key elements of a revised FIS, work with DOF to define the costs and benefits of different elements of a future strategy in order to prioritize key intervention areas. This cost and benefits analysis should be done in terms of the costs to DOF, local government and communities of generating and using information compared with the benefits derived from policy-related impacts.
- Assist, where necessary, with the redesign of collection, management, analysis, and dissemination stages of the system to monitor the impact of policy.
- Develop protocols for these different elements of the FIS to ensure the wide distribution, understanding and uptake of the information among decision-makers.
- Define and provide training required by staff at different levels of the system to implement the different elements of FIS. Training may also be needed in the use of specific guidelines identified below.
- Help to develop sector-specific guidelines for development planning, service delivery and the formulation of local legislation that can translate policies into understandable media for different user groups at the community, district, region and national levels. In particular these should include guidelines of socio-economic development, socio-economic impact monitoring, co-management approaches, and systematic ways of assessing and developing alternative livelihood options for the poor.

- Develop in conjunction with FIS stakeholders an informing and influencing strategy to define the information requirements and packaging of the target audience of the FIS.

5.3 Helping define the information requirements in support of co-management

Even for countries with well developed local government reform programmes there is often a need to translate this into a coherent and strategic sector approach to facilitate the development of small-scale fisheries co-management. In consultation with stakeholders an initial inventory of fisheries, their subdivisions into management units and the arrangements that will be suitable for their co-management must be defined. These consultations will need to take account of local administrative boundaries and constraints.

With the development of an initial inventory consideration can then be given to the decision-making requirements and their information needs. These must be clearly defined and responsibility for their provision allocated among the co-management stakeholders. The information requirements must include poverty-focused indicators coherent with monitoring the achievement of sectoral policy in addressing national objectives.

Cost should not exceed the benefits derived from this co-management intervention. The above inventory process will allow such an analysis to be undertaken and may prove invaluable in developing an appropriate management framework supported by FIS.

REFERENCES

Baylee, P.B. & Petrere, M. 1989. Amazon Fisheries: Assessment Methods, Current Status and Management Options. Can. Spec. Publ. Fish. Aquat. Sci. 106: 385-398.

Coates, D. 2002. Inland capture fishery statistics of Southeast Asia: Current status and information needs. Asis-Pacific Fishery Commission, FAO, Regional Office for Asia and the Pacific, Bangkok, Thailand.

Crispoldi, A. 2002. Agricuture Census: a New Prospect for Inland Fishery Information. In New Approaches for the Improvement of Inland Capture Fishery Statistics in the Mekong Basin; Report of the Ad hoc Expert Consultation, Udon Thani, Thailand. ISBN: 92-5-104902-5.

FAO. 2001. Annual Production Statistics. www.fao.org.

FAO. 2002. New Approaches for the Improvement of Inland Capture Fishery Statistics in the Mekong Basin; Report of the Ad hoc Expert Consultation, Udon Thani, Thailand. ISBN: 92-5-104902-5.

Hortle, K.G & Bush, S.R. 2002. Consumption in the Lower Mekong Basin as a Measure of Fish Yield. In New Approaches for the Improvement of Inland Capture Fishery Statistics in the Mekong Basin; Report of the Ad hoc Expert Consultation, Udon Thani, Thailand. ISBN: 92-5-104902-5.

Hoggarth, D.D. & Cowan, V.J. 1999. Management Guidelines for Asian Floodplain River Fisheries. Part 1: a Spatial, Hierarchial and INtegarted Strategy for Adaptice Co-management. FAO Fisheries Technical Paper 384/1: 63pp.

Nouv, S., Sopha, L. & Sensereivorth, T. 2002. Improving Inland Capture Fishery Statistics in Cambodia. In New Approaches for the Improvement of Inland Capture Fishery Statistics in the Mekong Basin; Report of the Ad hoc Expert Consultation, Udon Thani, Thailand. ISBN: 92-5-104902-5.

Phillipson, J. 1996. The sustainable development of UK fisheries: opportunities for co-management. Sociologoica-Ruralis 36: 201-211.

Pinkerton, E. 1989 "Introduction: Attaining Better Fisheries Management through Co-Management - Prospects, Problems and Propositions" Pp. 3-36 in E. Pinkerton (Ed) Cooperative Management of Local Fisheries. Vancouver: University of British Columbia Press.

Pomeroy, R.S. 1995. Community-based and co-management institutions for sustainable coastal fisheries management in Southeast Asia. Ocean and Coastal Management 27: 143-162.

Pomeroy, R.S. & Williams, M.J. 1994. Fisheries Co-management and Small-scale Fisheries: a Policy Brief. International Centre for Living Aquatic Resource Management, Manilla, 15pp.

RFIS. 2003. Report on the Importance of Marine Fisheries to Coastal Community Livelihoods in SADC Countries. 18pp.

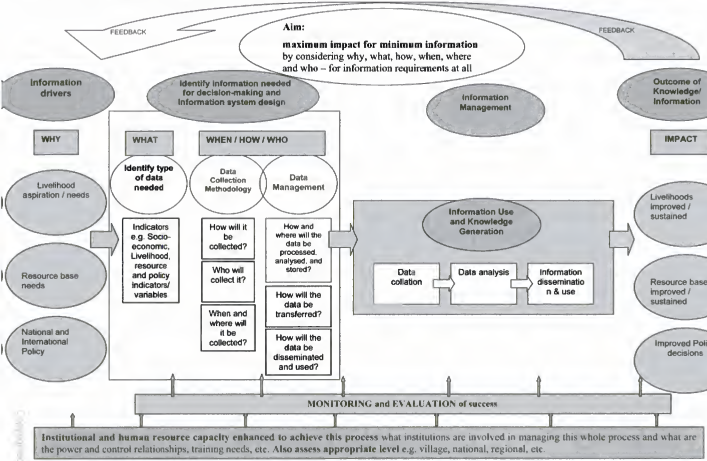
SADC. 2002. Southern African Development Community Sector Coordinating Unit for the Marine Fisheries 2001 Newsletter, 10pp.

Sen, S. & Nielsen, J.R. 1996 "Fisheries co-management: a comparative analysis" *Marine Policy* 20(5):405-418.

Svendrup-Jensen, S. 2002. Fisheries in the Lower Mekong Basin: Status and Perspectives. Mekong River Commission Phnom Penh, MRC technical Paper No. 6, 103pp.

Welcomme, R.L. 2002. Data Requirements for Inland Fisheries Management. In New Approaches for the Improvement of Inland Capture Fishery Statistics in the Mekong Basin; Report of the Ad hoc Expert Consultation, Udon Thani, Thailand. ISBN: 92-5-104902-5.

APPENDIX FISHERIES MANAGEMENT AND THE INFORMATION PROCESS


FEEDBACK
FEEDBACK
Aim:
maximum impact for minimum information
by considering why, what, how, when, where and who – for information requirements at all
Information drivers
Identify information needed for decision-making and information system design
Information Management
Outcome of Knowledge/ Information
WHY
WHAT
WHEN / HOW / WHO
IMPACT
Livelihood aspiration / needs
Resource base needs
National and International Policy
Identify type of data needed
Indicators e.g. Socio-economic, Livelihood, resource and policy indicators/ variables
Data Collection Methodology
How will it be collected?
Who will collect it?
When and where will it be collected?
Data Management
How and where will the data be processed, analysed, and stored?
How will the data be transferred?
How will the data be disseminated and used?
Information Use and Knowledge Generation
Data collation
Data analysis
Information dissemination & use
Livelihoods improved / sustained
Resource base improved / sustained
Improved Policy decisions
MONITORING and EVALUATION of success
Institutional and human resource capacity enhanced to achieve this process what institutions are involved in managing this whole process and what are the power and control relationships, training needs, etc. Also assess appropriate level e.g. village, national, regional, etc.

7. THE CONTRIBUTION OF RESEARCH TO THE SUSTAINABLE LIVELIHOODS OF ARTISANAL FISHING COMMUNITIES

Overview and final report of a study conducted in West Africa (Cameroon, Guinea, Mali, Mauritania, Nigeria and Senegal)

Karim Hussein and Jean Zoundi

EXECUTIVE SUMMARY

Background and rationale

In September 2001, the Sustainable Fisheries Livelihoods Programme (SFLP) commissioned this study of the contribution of research to the sustainable livelihoods of artisanal fishing communities. The study covers six countries in the region: Cameroon, Nigeria, Mali, Guinea, Senegal and Mauritania. It was based on the following observations: that linkages between artisanal fishing communities, policies and institutions and research are generally weak; and that research does, nevertheless, have an important contribution to make in improving livelihoods through the generation of knowledge and technological innovations.

The overall study was coordinated by two international specialists in research-resource user linkages and national studies were implemented by the national fisheries research institute in each country, through multidisciplinary research teams involving representatives from research institutes, government policy departments, non-governmental organizations (NGOs) and private sector consultancies. Each country team produced four interim reports covering the core study themes: (i) identification of key livelihood groups involved in artisanal fisheries; (ii) evaluation of the existing potential of fisheries research at the national level (including social science research on fisheries) and eventual contribution to livelihoods, and analysis of existing linkages between research and fisheries resource users; (iii) study of the effects of policies, institutions and processes (PIP); and (iv) identification of key lessons and activities to improve research-user linkages so as to increase the contribution of research to artisanal fishers' livelihoods. The methodology drew on core Sustainable Livelihoods (SL) principles (e.g. partnership, participation; multidisciplinary analysis and macro-micro level linkages) and involved a process of validating results with a range of actors at national level.

This overview presents some key issues that emerge from the six detailed country studies, highlights lessons identified, and identifies priority recommendations to improve the contribution of research at the national and subregional levels.

Key issues

Livelihood groups in artisanal fishing. The study revealed the great diversity in livelihood groups that use or depend on artisanal fisheries resources for a living. These range across upstream and downstream aspects of production – from fisherfolk through to traders and boat mechanics. There is some gender specialization of tasks and varying degrees of migration – the most important aspect of which is the need to migrate in order to follow a moving resource. Attempts to analyse the degree of vulnerability of each group reveal a wide range of factors affecting vulnerability in each context. Surprisingly perhaps, while in certain contexts fishers have the potential to gain the highest surplus, they have to make the heaviest capital investments and are often the most vulnerable group. The Nigeria study attempted to reflect this by developing a quantitative analysis of the costs of vulnerability.

Research providers. In each country, it is clear that a wide range of actors is involved in fisheries research. These include public sector research institutes, State funded universities, international NGOs, the private sector and development programmes. Some strengths in fisheries research are identified: incorporation of research themes on artisanal fisheries following participatory processes;

existence of formal and in some cases informal frameworks for collaboration between the different actors in the sector; and changing status of research institutions that encourage researchers to be more innovative and oriented towards development (e.g. Mali and Senegal). However, partnerships between actors are patchy. Further, in most cases there is a deficiency in capacities for socio-economic analysis and limited experience in participatory research. In all countries national research institutes are hampered by a major funding crisis that also undermines the contribution of agricultural research more broadly to development and improved livelihoods across the developing world.

Policies, institutions and processes. The existence and effectiveness of mechanisms for fisheries research to contribute in the area of PIP vary. Nonetheless, the study shows clearly that fisheries research has the potential to make a strong contribution: enabling policy-makers to make informed decisions, formulate appropriate laws on resource use and contribute effectively to wider processes (e.g. international negotiations of fisheries resources). However, public research institutions have taken a long time to adapt to the requirements of a development orientation and general factors in the PIP context have constrained their ability to contribute to improved livelihoods: e.g. structural adjustment has led States to reduce their investment in research, such that it becomes ever more dependent on dwindling international funds.

Lessons and implications

Ten principal lessons are identified:

1. Despite deficiencies noted, there has been a positive evolution in thinking and approaches in research institutions covering fisheries in the last decade (e.g. addressing PIP issues; move towards a development orientation).
2. Promotion of local rules for fishery resources management with high involvement of local communities.
3. Producer organizations in artisanal fisheries are generally weak when compared to those that exist in other natural resources sectors, such as agriculture and animal production.
4. Fisheries research has contributed substantially to the improved livelihoods of fisheries communities and to addressing issues in the policy and institutional context (e.g. providing information and innovations to policy makers).
5. It will be possible to capitalize more on the contribution of socio-economic research, for example in strengthening the capacities of fisheries communities.
6. Several countries do not place high priority on fisheries research, and their sectoral allocation of resources prioritizes other areas of production. Furthermore, there is a general financing crisis faced by agricultural research.
7. Fisheries research institutes have found it difficult to develop effective demand-driven approaches to research.
8. There are very few examples of direct partnerships between research and fisheries communities or their representatives.
9. There is a general lack of mechanisms, or frameworks, for communities to learn from research – much due to failures in extension.
10. Incoherence of some government policies may be having negative effects on artisanal fishers' livelihoods (e.g. support in principle for the profession of artisanal fishing, but promotion in practice of increased industrial fishing).

Actions needed

Fifteen actions needed to improve the contribution of research to artisanal fishers' livelihoods are identified. Priority actions are grouped under four headings:

- Strengthen the institutional, management and strategic planning capacities of socio-professional organizations in the artisanal fishing sector.

- Strengthen or establish mechanisms for partnerships between research and fisheries communities;
- Strengthen the capacities of fisheries research institutions (e.g. sustainable financing; improved skills, particularly in social science and participatory approaches).
- Strengthen the contribution of fisheries research to policies and livelihoods (e.g. creation of a liaison body bringing together representatives from research, policy-makers and artisanal fishers; establishing mechanisms to apply research results to constraints and opportunities that exist at the community level).

Recommendations

Drawing on the analysis of the country studies presented in this report, the authors make seven recommendations to the SFLP in order to improve the contribution of research and bring about changes in practice:

1. Publication of this overview report and broad dissemination in hard copy to research institutions, policy-makers and development actors in all 25 countries involved in the SFLP. This report should also be made available through the web.

2. Dissemination of study results in the 19 programme countries that did not participate in this study through subregional workshops involving representatives from research, extension, artisanal fisheries resource users, NGOs, private sector). This activity can be undertaken through or with the support of subregional and international networks.

3. Provision of funds in study countries for pilot activities to support partnerships between research and communities for the participatory development of innovations.

4. Training for research institutions in participatory approaches in countries where such a need is expressed.

5. Improve capacities of research institutes to communicate results effectively, even through new media (e.g. radio).

6. Strengthen country-level capacity for analysing the impacts of fisheries research.

7. Encouragement to governments to foster national debate on improving the orientation and sustainable financing of fisheries research.

Immediate follow-up

Drawing on the analysis and recommendations above, five suggestions are made for immediate follow- up to this study, identifying actors responsible and strategy.

Subregional level

i) Publication and dissemination of this overview report (by Regional Support Unit (RSU) before end September 2002).

ii) Share lessons from the study in the 19 other countries covered by the SFLP through two to three subregional workshops (by RSU before end October 2002).

iii) Identify priority actions to implement, as part of country-level programme initiatives, according to classification of priorities at Programme-wide level (by RSU before end December 2002).

National level

Editing, publication and distribution of a hard copy of the detailed national reports (by NCU in each country before end July 2002).

Drafting and dissemination of Advisory Notes to decision-makers.

Organization of national multi-stakeholder workshop to consider the implementation of recommendations and the responsibilities of each actor (by National Coordinating Unit (NCU) in each country before end October 2002).

This synthesis report, the six country reports and Advisory Notes for decision-makers, provide tools that can be used to guide changes in the organization of fisheries research. They might also serve to underpin proposals for actions to enhance the role of fisheries research both in policy and at the level of the livelihoods of artisanal fishing communities.

1. STUDY CONTEXT AND OBJECTIVES

1.1 The SFLP

The Sustainable Fisheries Livelihoods Programme (SFLP) was established in 1999, initially for a 5-year duration. It is a programme funded by the Department for International Development of the United Kingdom (DFID) and executed by the Organization for Food and Agriculture of the United Nations (FAO) in collaboration with the governments of the countries involved. It covers 25 countries in West Africa, 20 coastal countries and 5 landlocked, in which livelihoods of about seven million people depend on the utilization of aquatic resources. The Regional Support Unit (RSU) based in Cotonou, Benin is implementing the programme in collaboration with National Co-ordination Units at country level.

The main objective of SFLP is to assist the artisanal fishing communities (coastal and inland) to improve their livelihoods through the sustainable use of aquatic resources, thus reducing poverty.

The SFLP will also assist governments in drawing up policies and action plans which take into consideration the principles of the Code of Conduct for Responsible Fisheries (CCRF) informed by the Sustainable Livelihoods Approach (SLA).

It will also assist the grassroots communities to develop their capacity to participate more effectively in the planning and development of fisheries and thus strengthen or even create, a link between the communities (micro level) and the local, regional and national structures (meso and macro levels).

The primary beneficiaries of SFLP are the fishing communities in particular the fishers, the processors and the petty traders throughout the 25 countries. The secondary beneficiaries are the Fisheries Departments, the NGOs, the sectoral planners and all other persons having some responsibility in the development of the fisheries sector and poverty alleviation.

The SFLP bases its actions on three considerations:

- The existence of important threats and constraints to the sustainable utilization of aquatic resources by artisanal fishing communities.
- The possibility of improving their livelihoods and alleviating poverty within these communities though responsible development.
- The use of an appropriate approach (SLA) and elements of the CCRF permitting: (i) an improvement in the participation of actors in the process of responsible and sustainable co-management implying a sharing of responsibilities on the sustainable use of resources; and (ii) the encouragement of a more equitable distribution of generated profits.

One of SFLP's roles is to assist in creating the necessary climate so that the communities are in a position to evaluate their environment and their situation. In order to do this, the SFLP is developing a participatory approach, which enables it to undertake sensitisation and capacity-building actions in order to develop reflection, analysis and discussions within the communities.

SFLP initiatives are articulated through:

(i) Community projects focusing on specific actions in response to a local problem and aimed especially at enhancing the assets of fishing communities.

(ii) Pilot projects, which are large-scale actions, executed on a regional or sub-regional level.

(iii) Institutional support that is provided on a case-by-case basis in response to a request (this study falls into this category).

1.2 Objectives of the study on the contribution of research

This study covers six countries associated with SFLP, Cameroon, Nigeria, Guinea, Mauritania, Senegal and Mali. The study is based on one main observation: the links between the artisanal fishing communities, the policies that influence their livelihoods and research, are weak. At the same time, however, it is assumed that the contribution of research can be important in the improvement of livelihoods by generating knowledge and technological innovations.

Consequently, the commissioned study deals with the linkages existing between research and fishing communities and the present and potential contribution of fishery research to the improvement of the SL of fishing communities in the subregion. The study lasted nine months and covered five specific areas:

i) Identification of the diversity of the major livelihood groups and community/group strategies using fisheries resources.
ii) Evaluation of the potential of fishery research (including research in social sciences) and probable contribution to SL.
iii) Analysis of links existing between research institutions (fisheries and social sciences) and links between research and users of fisheries resources.
iv) Study of the effects of policies, institutions and processes (PIP) on research into SL and the contribution of fisheries and socio-economic research on the PIPs.
v) Identification of key lessons and activities to improve the contribution of fisheries research to the reduction of communities livelihoods from artisanal fishing.

2. METHODOLOGY AND LIMITATIONS OF THE STUDY

2.1 Methodology and approach

The implementation of the study was based on the following global organization:

i) The conduct of case studies in each of the six countries chosen by a multidisciplinary, multi-institutional team.

ii) The global coordination and direction of actions by two international consultants also mandated with the general synthesis of the results of the study.

The study methodology was designed on the basis of four priority areas of investigation described in the Terms of Reference (TOR) (Annex 5) of the study:

- The identification of the diversity of SL groups concerned by artisanal fishing and their strategies.
- The potential and contribution of fishery research to the SLs of these populations.
- PIPs in research.
- Key lessons and activities to improve the contribution of research.

In relation to the basic principles of the SLA, this study has been conducted in partnership with public and non-governmental actors, emphasizing dialogue and participation at all stages. The participatory approach of this study was demonstrated first at a planning workshop organized by the SFLP in Cotonou (Benin) in October 2001. This meeting brought together representatives of the NCUs, fisheries research and the NGOs with the aim of examining, validating and finalizing proposals on methodologies and also come to an agreement on expected outputs of the study and the responsibilities of each actor. A summary of some indicative methodologies, as well as distribution of tasks is to be found in Annexe 1 and 2.

The other elements of the methodology comprised the following key points:

i) Constitution of national work teams according to a participatory approach. In all the countries concerned, multi-disciplinary and multi-institutional teams (including representatives of public institutions: research, university, support structures, NGO, professional organizations) were set up.

ii) Data collection in relation to the five major study points.

iii) Data processing and the drafting of interim outputs and final documents.

iv) Validation of interim and final outputs at country level. Thus, in each country, national validation workshops were organized and brought together all categories of actors involved with the subject (users, researchers, technicians, decision-makers).

This participatory approach, developed throughout the different stages, was designed to guarantee the final appropriation of the outputs in each country and contribute to building the capacities of the research institutions involved.

2.2 Limitations of the study

One of the major limitations to the study was the fact that meagre financial resources did not permit the international consultants to give more sustained support to the different nationals at certain critical times. This led to bias in the acquisition of certain data, as well as the detailed consideration of certain analysis. This drawback is the reflection of imbalances found between national documents in terms of the amount of qualitative and quantitative information. Of course this situation obviously has consequences on the depth of certain analysis made in this synthesis.

3. LIVELIHOODS GROUPS CONCERNED WITH ARTISANAL FISHERIES

The six national reports give an informative view of the diversity of groups of users of artisanal fisheries resources. In each country six to seven major livelihood groups have been defined. Taking into account the diversity of actors involved and their interests. Characterization of the different groups focused on the following factors:

- identification of major groups and characteristics/ key strategies;
- analysis of the livelihood opportunities (capital) and constraints related to them;
- vulnerability of groups;
- gender differences;
- organizational level of various SLs.

The detailed analysis of these groups and their vulnerability context are presented in the six national reports. Here, we present an overview of characteristics of the groups found in almost all the countries (Table 1). Box 1 gives an example of characteristics of two groups of livelihoods in Guinea: fishermen and processors. They show the difference or diversities in characteristics, constraints or strategies.

The results on the livelihood groups show the importance of fishery research taking into account all the categories of actors acting both upstream and downstream. This enables a response to the specific constraints and increased impact on all the groups involved: fishers, wholesale fish merchants, boat owners, processors, service providers etc.

Table 1: Synthesis: Some livelihood groups in artisanal fisheries

SL Group	Main Characteristics	Key "Gender" issues	Key strategies	Major constraints relating to capital	Key vulnerability factors	Observations
Fishers	(a) Do not own fishing gear. (b) Are employed by ship owners. (c) Are paid by the piece/part.	(a) Groups consisting mainly of men (at least 80%). (b) Groups consisting of indigenous and non indigenous settlers.	(a) Are very mobile and follow the movement of the resource (migration). (b) Some engage in secondary activities (agriculture, cattle–rearing, petty trading…). (c) Good organization within the group.	(a) Certain fisheries resources are endangered (diminishing resources). (b) Illiteracy of communities. (c) Low level of training (professionalism). (d) Inadequate organization and supervision. (e) Limited access to credit (f) Inadequacy or absence of basic infrastructure (education health, roads….). (g) High costs of inputs. (h) Difficult access to land for farming	(a) Frequent disputes between industrial and artisanal fishermen (non-respect for zones). (b) Rebel incursions in some countries (Guinea). (c) Piracy at sea and insecurity (risk of loss of life). (d) Inadequate application of texts in some countries. (e) Slow-down in fishing activities at certain times of the year. (f) Disputes between indigenous and settler fishermen. (g) Changes in policies (disengagement. liberalisation…). (h) Difficult access to credit.	(a) These groups are relatively well organized (professional organizations).
Wholesale fish sellers	(a) Derive most of their income from fish selling. (b) Employ pieceworkers.	(a) Groups comprise men and women in different proportions depending on the country: a.1. Mostly women (Mauritania) a.2. Especially women (at least 90%) (Cameroon, Guinea, Mali, Nigeria, Senegal).	(a) Include smoking activities in some cases. (b) Diversify their activities. (c) Pre-finance fishing trips. (d) Are mobile.	(a) Illiteracy. (b) Low level of training (professionalism). (c) Inadequate organization and supervision. (d) Lack of inadequacy of storage, transport infrastructure. (e) High rates of interest and inflation	(a) Landlocked zones of fishing activities especially in the winter period. (b) Inadequacy or lack of credit institutions. (c) Inadequate resource and seasonal fluctuation in its availability (seasonality of the activity).	
Processors	(a) Own processing equipment. (b) Derive most of their income from processing.	(a) Group comprises mainly women (98%).	(a) Often on the fish seller circuit. (b) Often pre-finance fishing trips. (c) Diversification of species processed and sources of supply. (d) Diversification of activities by integrating petty trading. (e) Rarely migrate.	(a) Fishery resources threatened by over-exploitation (diminishing resource). (b) High illiteracy rate. (c) Low level of training (professionalism) – ignorance of quality standards (d) Activity-related sanitation problems. (e) Inadequate organization and supervision. (f) Difficult access to credit. (g) Diminishing wood energy resources	(a) Seasonal disappearance of the resource to be processed. (b) Reduction in forestry resources due to intensive utilization of forestry resources by development projects). (c) Inadequacies of infrastructure (motorways, cold chains, transport …). (d) Macroeconomic policies (liberalisation, elimination of subsidies…).	(a) Groups more often than not well organized and structured.

Table 1 (contd): Synthesis: Some livelihood groups in artisanal fisheries

SL Group	Main Characteristics	Key "Gender" issues	Key strategies	Main constraints regarding capital	Key vulnerability factors	Observations
Ship owners	(a) Own fishing gear. (b) Finance fishing operations; often employers of fishermen.	(a) Group comprising mostly men (90%).	(a) Migrate with crews in order to better supervise activities. (b) Remain linked to the fishermen with whom they form cooperatives or associations. (c) Practice other activities to diversify their sources of income (agriculture…).	(a) Fisheries resources threatened by overexploitation. (b) High illiteracy rates. (c) Inadequate knowledge of normal regulatory texts in some cases. (d) Inadequate level of organization and supervision. (e) Obsolete equipment and lack of safety equipment at sea. (f) Difficulty in accessing credit and high level of inflation.	(a) Disputes between artisanal and industrial fishermen. (b) Ineffective application of regulatory texts is the cause of conflict. (c) Slowdown in fishing activities at certain period of the year.	(a) These groups are often well-organized (professional organizations).
Mechanics	(a) Work exclusively on the engines and outboard motors. (b) Paid piecemeal.	(a) Groups made up of men.	(a) Set up mainly on larger jetties.	(a) Low level of qualification for some (professionalisation). (b) Poor organization and supervision. (c) Scarcity and expensiveness of motors and spare parts. (d) High inflation and interest rates.	(a) Scarcity and high costs of motors and spare parts following State disengagement from import circuits. (b) Weak or absent credit institutions. (c) Slowdown in fishing activities at certain period of the year (fall in demand for repairs).	
Boat Builders	(a) Build and repair boats. (b) Only set up on big landing jetties. (c) Are paid per job or for the sale of equipment.	(a) Groups exclusively comprising men.	(a) Have other activities (agriculture, petty trading…). (b) Are not mobile.	(a) Some forestry resources endangered by over-exploitation. (b) Low level of training (professionalisation). (c) Poor organization and supervision.	(a) Deforestation accompanied by reduced wood resources. (b) Weak or absent credit institutions. (c) Slowdown in fishing activities at certain periods of the year (seasonality of demand). (d) Macroeconomic changes which affect prices of materials.	(a) Groups more often not well organized and structured.
Net makers	(a) Produce and repair nets. (b) Are remunerated piece meal.	(a) Groups comprise mainly men. (b) But some women and youth are involved in the maintenance and upkeep of the nets.	(a) Have other activities (agriculture, petty trading…) (b) Are often mobile.		(a) Reduction in the resource and fishing activities at certain times of the year (lower demand for maintenance).	

Box 1: Fishers and fish processors in Guinea

Fishers

Main Characteristics

i) Do not own fishing gear.
ii) Are employed by boat owners.
iii) Are remunerated piecemeal/share basis.
iv) Fishing constitutes the sole source of income for full-time fishermen and more than 50 percent for the multi-disciplinary (exercizing several activities).
v) Group comprising exclusively men (minimum age 15; average 36 years).
vi) Group linked to professional organizations (e.g. National Union of Artisanal Fishermen of Guinea – UNPAG).

Key Strategies

i) Migrate frequently and follow the movement of fishery resources.
ii) Some of them have secondary activities (agriculture, cattle rearing, petty trading...).

Major constraints related to capital

i) Shrinkage of the resource.
ii) High illiteracy levels.
iii) Low level of training and supervision (lack of professionalism).
iv) Difficult access to credit.
v) Difficult access to land for those engaged in farming.
vi) Absence or inadequacy of basic infrastructures (education, health, roads, food, water…).

Vulnerability

i) Seasonality of the activity (reduced resources in certain periods of the year).
ii) Frequent disputes between artisanal and industrial fishermen (destruction of fishing gear) – inappropriate application of current regulatory texts (non observance of fishing zones).
iii) Insecurity at sea (risk of loss of life): rebel incursions (2000-2001).
iv) Change in policies (disengagement, liberalisation…): high cost of inputs, inflation…

Fish Processors

Main characteristics

i) Owners (individually or collectively) of processing equipment.
ii) Obtain most of their income from fish processing.
iii) Group comprises mainly of women (90 percent) average age 44 years.
iv) Group showing solidarity and organization (e.g. Co-operative of Female Fish Smokers of Bonfi – (COFFUB)).

Key Strategies

i) Often on the same circuit as the wholesalers.
ii) Often pre-financed fishing trips (to have better access to the resource).
iii) Rarely migrate.

Major constraints related to capitals

i) Reduction in the resource to be processed (seasonal variations in the volume of processing activities).
ii) High level of illiteracy.
iii) Low level of training and supervision (lack of professionalism) - quality standards not taken into account.
iv) High rates of inflation and interest.
v) Deterioration in health status due to smoke.

Vulnerability

i) Reduced wood resources.
ii) Seasonal variation in the availability of the resource for processing.
iii) Rebel incursions (affecting the availability of the resource to be processed).
iv) Embezzling of working capital by crew members.

Source: Guinea national report

The following findings emerge from the analysis of national reports:

- in order to initiate a response to the needs of the various groups it is first of all necessary that the research take account of the great diversity of SL groups depending on fishery resources and the specific constraints which affect each of them ;
- there is a similar diversity of SL groups existing in areas of maritime and inland fishing (see the reports from Nigeria and Mali where the two types of fishing are present);
- almost everywhere across the board it appears that "fishermen" exercise other income-generating activities to diversify their livelihoods (e.g. agriculture, net production, petty trading)
- access to SLs by different groups largely depends on capacities, assets and the financial status of the individuals concerned (the obstacles to access the resources are not always clear-cut);
- some groups are dominated either by women or by men: for example, apart from a few exceptions, most of the fishermen are men while the processing (smoking for example) is dominated by women; it is the men who have a greater tendency to control the more lucrative activities (e.g. offshore fishing on a larger scale), but this is not always the case. (see Box 2)
- all the SL groups have little ability to influence national policies, given the weak links between formal institutions involved in the development of fisheries policies at the macro level and the local population;
- national reports demonstrate the difficulty and the complexity of analysing vulnerability factors: vulnerable groups vary depending on context but in Cameroon and Nigeria the fishermen were identified as being relatively more vulnerable due to numerous factors (e.g. seasonal character of fishing, overexploitation of resources and fall in yields, fluctuations in prices of inputs and limited access to credit, changes in macro-economic policies, insecurity, thefts, communal disputes, police harassment and risk of loss of life at sea).

Box 2: Gender issues in artisanal fishing in Nigeria

In Nigeria, the predominance of women or men in an SL group normally depends on several factors:

- the assets and training required to engage in the activities;
- religious or cultural norms which prohibit certain activities depending on sex in certain regions (e.g. in northern Nigeria, women, and in particular Muslim women of child-bearing age, are forbidden from marketing fish leaving women from the south to dominate this trade).

A lot of work and tasks are distributed on gender basis. Men dominate the following groups: fishers, mechanics, boat builders, and trade in equipment. Women often control the following: processing/conservation of fish products (smoking, drying etc.), the fish trade in those places where there are no socio-economic constraints and net production; they are also involved in inland fisheries. It is also to be observed that there is a general distribution between inland fisheries that is dominated by women and offshore activities that are the exclusive preserve of the men. This distribution can be explained by maternal responsibilities of women and the danger and loss of life often recorded at sea.

This distribution of work has economic consequences. Whereas the capital costs for maritime fishing are high, the profits made are much more substantial than for river fishing.

Source: National Report, Nigeria

The Nigerian team made an interesting attempt at analysing vulnerability costs for each SL group. The usefulness of the innovative methodology proposed merits for further consideration in future research work (see Box 3).

Box 3: Vulnerability costing for artisanal fishing SL groups: Example of fishers

The vulnerability costs of the fishermen threatened by trawlers are calculated bearing in mind the following factors:

- cost of capital
- loss of income

The cost of capital is obtained by multiplying the average number of nets destroyed by trawlers in one fishing season by the average cost of a net and the number of fishing communities on the coast threatened by the trawlers.

The loss of income is determined by the product of the value of fish caught on each trip and the average number of trips per fisher per month per community.

Thus, for this SL group, vulnerability in terms of the cost of capital is estimated at about 18,495,000 Nigerian *Naira*. The vulnerability in terms of loss of income is estimated to be between 34 and 46 million Naira.

Source: Nigeria national report; 1US$ = 119.50 Naira

4. FISHERIES RESEARCH SERVICES PROVIDERS

The concept of providers of research services or "fisheries research" is taken in the widest sense of the term, that is, it refers to all the units where teams (biologists, socio-economists….) working for the generation of technologies and/or knowledge in the area of fisheries. This concept, which integrates social sciences, seems to be in keeping with the reality of research institutions considered in this study.

4.1 General situation

4.1.1 Type of institutions involved

Several institutions are involved in the provision of fisheries research services. The number and nature of institutions involved varies from country to country. Generally speaking, the categories of institutions described below provide research services to different users (fishing communities, political decision-makers) (Table 2).

Public research or training institutions

This category of provider groups national research institution as well as foreign institutions the most heavily present being the French Institute for Development Research (IDR). It is to be noted that in some countries such as Guinea, the action of foreign, public institutions like IDR are completely integrated into the national structure.

As regards national research institutions in particular, two sub-categories are noted:

(a) Institutions with an exclusive mandate to conduct fisheries research

This is the situation found in countries like Guinea with the "Centre National des Sciences Halieutiques de Boussoura" (CNSHB) and the "Centre de Recherche Scientifique de Conakry – Rogbanè" (CERESCOR), Mauritania with the "Institut Mauritanien de Recherches Océanographiques et des Pêches" (IMROP) (e.g. "Centre National de Recherches Océanographiques et des Pêches" (CNROP)), Senegal with the "Centre de Recherches Océanographiques Dakar-Thiaroye" CRODT and Nigeria with the Nigerian Institute for Oceanography and Marine Research (NIOMR) and the Nigerian Institute for Freshwater Fisheries Research (NIFFR).

(b) Institutions with no exclusive mandate to conduct fisheries research

This is the situation found especially in Cameroon with the Institute for the Agricultural Research (IRAD) and Mali with the Institute of Rural Economy (IER). Within such institutions, fisheries research is often only a small part of a mechanism which deals with agricultural research and rural development as a whole.

In addition to national research institutions, several national universities are also involved in the provision of fisheries research services. This situation is true almost everywhere with various degrees of involvement depending on the country.

Apart from these training and research institutions, there is a strong involvement of projects, programmes or development bodies in the provision of fisheries research services. This is the situation namely in Mali with the Office for Rural Development of Sélingué (ODRS) and the "Opération Pêche Mopti" (OPM), in Mauritania with the Banc d'Arguin National Park (PNBA) or Cameroon with the South West Development Authority (SOWEDA). In most cases, these bodies or development projects act on behalf of the fishing communities, as spokesmen to express their needs. They also participate in the funding of research and development activities and ensure dissemination of results obtained.

The general analysis of public institutions reveals that the priority given to fisheries research varies between countries. This priority is often a reflection of the status of the institution and especially, the resources allocated by the Government. Box 4 gives two rather extreme situations in Mali and Mauritania.

Table 2. General situation of research service providers in the countries under review

Country	Type of institution involved	Service fields covered	Diversity and capacities of providere		Aptitudes in development-centred research	
			Strong points	Weak points	Strong points	Weak points
Cameroon	Public (a) Research Institutions (b) Universities	(a) Generation of technologies and knowledge. (b) Creating/Building capacity.	Existence of universities taking into account social sciences (sociology, anthropology…).	(a) Low consideration of fisheries research by the universities. (b) Only IRAD works in the area of fisheries research. (c) Dearth of resources in social sciences.	(a) Diversity of disciplines represented within the research teams.	(a) Low quantitative representation of social sciences. (b) Absence of mechanisms for direct partnerships with users. (c) Absence of Boxworks or mechanisms for the participation of research in policy formulation. (d) Absence of incentives to develop participatory approaches.
Guinea	Public (a) Research Institutions (b) University	a) Generation of technologies and knowledge. (b) Creating/Building capacity.	(a) Existence of a relatively large group of scientists working in fisheries research. (b) Existence of multi-disciplinary research teams.	(a) Low level of involvement of universities in fisheries research (apart from the work done by trainees). (b) Low number of human resources in social sciences within the research institutions.	(a) Multidisciplinary research teams. (b) Existence of a Boxwork for technical dialogue within the ministry responsible for fisheries.	(a) Poor development of participatory approaches. (b) Absence of mechanisms for direct partnership with the communities (users).
Mali	Public (a) Research Institutions (b) University (c) Office of rural development Foreign research institutions (a) IRD	(a) Generation of technologies and knowledge. (b) Creating/Building capacity.	(a) Several research institutions and development bodies investing in the fisheries sector.	(a) Fisheries research only represents a tiny part of the total agricultural research mechanism (b) Limited scientific skills. (c) Legal status (PAE) of research institutions does not permit mobilization of adequate human resources	(a) Existence of a system of research-on-demand with the RCUs.	
Mauritania	Public (a) Research Institutions. (b) University and International NGOs (UICN).	a) Generation of technologies and knowledge. (b)Creating/ Building capacity.	(a) Existence of a national institution specialized in fisheries research and enjoying substantial financial resources.	(a) Marginal action of the university in fisheries research (b) Legal status (PAE) does not afford flexibility in management (effectiveness). (c) Unattractive status limiting development and the maintenance of scientific skills.	(a) Initiatives to consider users as partners in research. (b) Development of participatory approach in certain projects.	(a) Research Institution designed solely to provide assistance in decision-making to the supervisory ministry. (b) Institution not really seen as a tool for users. (c) Absence of direct partnerships research –users. (d) Poor motivation of communities to collaborate with research.

Table 2 (contd). General situation of research service providers in the countries under review.

Country	Type of Institution Involved	Service fields covered	Diversity and capacity of providers		Aptitudes in development-related research	
			Strong points	Weak points	Strong points	Weak points
Nigeria	Public (a) Research Institutions. (b) Universities.	(a) Generation of technologies and knowledge. (b)Creating/ Building capacity.	(a) Research institutions possessing wide variety of scientific skills and taking social science specialities into account.	(a) Inadequate /insufficient financial allocation.	(a) Some training and updating in the participatory approach for officers in some co-operation agencies (GTZ). (b) Existence of linkage mechanism users-policies (NCA).	((a) Inadequate incentives for training in participatory approaches for researchers.
Senegal	Public (a) Research Institutions. (b) Universities, International Institutions (IRD and IIED), International NGOs (UICN, WWF and CREDETIP).	a) Generation of technologies and knowledge. (b)Creating/ Building capacity.	(a) Great diversity of institutions active in fisheries research. (b) Existence of a focal research institution (CRODT) endowed with PSTE status.	(a) Inadequate human and financial resources at the main institution (CRODT) – marked weakness in social sciences. (b) Multiplicity of technical and administrative supervisors from different fisheries research institutions which does not allow for synergy of action. (e) Absence of a national fisheries research system.	((a) Participatory approach encouraged through research activities. (b) PSTE status motivating staff to produce and ensuring better direction of research programmes by users. (c) Establishment of FNRAA with a view to promoting a system of research-on-demand, to guarantee output and quality of service delivery.	

Box 4: Priority given to fisheries research

Case of Mali

Economic value of fisheries

i) More than 40 billion CFAF turnover per annum.
ii) 4.2 percent of the GDP and 3 percent of the total value of exports.
iii) 500 000 jobs created.

Situation of fisheries research service providers

i) Fisheries research disseminated within several institutions including research, development and university institutions.
ii) A fisheries research team (core) within an institute with a general mandate for agricultural research in the broadest sense of the term (IER).

Scientific skills

i) A total staff of 7 specialists out of the 100 in IER handle fisheries research.
ii) Low resource allocation for the fisheries sector (78 percent of financial resources are earmarked for agricultural research, 21.8 percent to zoological and forestry research as against 0.18 percent for fisheries research).
iii) Budget allocation for fisheries research was 111.7 million in four years (1997-2000).

Case of Mauritania

Economic value of fisheries

i) 10 percent of the GDP, 29 percent of budget receipts and 50% of export receipts

Situation of fisheries research service providers

i) One main institution for fisheries research (Mauritanian Institute of Oceanographic Research and Fisheries (IMROP)) mandated to conduct fisheries research at national level.
ii) Other institutions like the university collaborating with IMROP for some fisheries research in the framework of student training.

Scientific skills

i) A large pool or researchers (31) from various disciplines (a dozen)
ii) A commensurate allocation of financial resources by the government. IMROP is almost entirely funded by the government
iii) A clearly substantial allocation of financial resources compared to other research sectors. (e.g. 140 million UM granted to IMROP in 2001 against 5 million to veterinary research whereas the cattle-rearing sector accounts for 18 percent of the GDP .

Sources: National reports, Maritania and Nigeria.

1 US$ = 740 FCFA; 1 US$ = 250 Naira

Private research or development institutions

This category of provider comprises several actors including:

(a) Non-governmental organizations (NGO); in this category are organizations such as the "Centre de Recherche pour le Développement de Technologies Intermédiaires de Pêche" (CREDRETIP), International Union for Conservation of Nature (UICN), World Wildlife Fund (WWF), "Environnement et Développement du Tiers Monde" (ENDA TM) and the "Association Sénégalaise travaillant sur la protection et conservation des ressources naturelles" (OCEANIUM), found in Senegal.

(b) Bilateral cooperation bodies (working through projects); this is the case with GTZ in Cameroon and Nigeria.

International institutions (e.g. IRD)

4.1.2 Scientific skills and type of services provided

The fisheries research service providers incorporate a varied range of scientific disciplines with numbers varying depending on the type and size of the institution. The table in Annex 3 gives an idea of the disciplines available within some public fisheries research institutions and highlights the great disparity between institutions, both in number of disciplines and number of research staff.

4.2 Aptitudes and skills in development research

The aptitude and skills of development research institutions varies greatly depending on the country (Table 2). In all cases there are both favourable and unfavourable factors:

The strong points or assets concern in particular:

(a) The existence of priority areas in fisheries research emerging from strategic research plans that were prepared following a multi-institutional, participatory approach (involving the users).

(b) The existence of frameworks (even informal) for dialogue between the research service providers, the technical ministerial departments and different categories of users. In Senegal there is FNRAA and the CNCPM, Nigeria, NCA and NACCIMA, Mali, CNRA, APCAM and the CRU; or the informal and periodic exchanges between research and technical ministerial departments in Guinea or Mauritania.

(c) The recent transformation of the status of some institutions into public scientific and technical establishments thus permitting greater efficiency in action and promoting the culture of enterprise. This is the situation observed in Senegal with ISRA/CEODT and in Mali with the IER.

The shortcomings on the other hand, pertain to:

(a) The absence of institutional mechanisms Research – Fisheries communities (professionals) - Policies

(b) Inappropriate status (PAE) of some research institutions, which has not permitted the fostering of development-based research (inflexibility in management, poor motivation of researchers to promote participatory approaches to development.)

(c) Inadequacy or even absence of mechanisms for the active participation of users in leading and directing research.

(d) Over-dependence of research institutions on external funding (at least 70 percent in some cases); which does not in some cases enable research to be directed towards concrete development concerns.

5. THE EFFECTS OF PIPS ON RESEARCH AND THE SLS OF FISHING COMMUNITIES

5.1 General analysis of PIPs and their effects on the fisheries sector and the SLs of artisanal fishing communities

General analysis demonstrates that the most striking fact about the PIPs has been the structural adjustment policies on-going in different countries since the beginning of the '90s. This deals essentially with:

(a) Government disengagement. This disengagement touched primarily on the production sector, supply of production factors (materials and fisheries inputs), marketing, the different governments focusing much more on regulation and control issues.

(b) making communities responsible for the handling of functions, formerly the responsibility of public structures. This process of responsibility assumption has been marked not only by the emergence of professional organizations, but in particular local powers (local autorities) through various decentralization processes.

This situation has had multifarious effects in the fisheries sector, both at support institution level and on the SLs of fishing communities

The notable **positive effects** have been:

(a) The emergence or strengthening of professional organization in the fisheries sector. This dynamic concerns all the socio-professional categories: fishermen, wholesalers, boat-owners, service providers, processors. In all the countries covered by the study, the emergence of professional associations has been noted. This is the case of ADAMAM in Cameroon, CONAPEG in Guinea, APRAM and APPM in Mali, FNP in Mauritania, FISON, NUFSD and NAFFA in Nigeria, CNPS, FENAGIE-P, FENAMS in Senegal.

(b) *The emergence of local powers* (local collectivities) within which fisheries professionals are integral parts.

(c) *Amendments to principles of application of legislation* in the fisheries sector. In some cases the inflexibility in application of laws and codes has progressively given way to participatory approaches and even to responsibility assumption by fishing communities. The example of Mali is given with grassroots community participation in preparation of local conventions to govern exploitation and management of fisheries research (case of the 5th region in Mali).

(d) The Code of Conduct for Responsible Fisheries (CCRF) has also emerged as a genuine instrument for fisheries management. It has thus influenced the conduct of a substantial amount of research on the provision of decision-making material in the area of fisheries development and the utilization and management of fishery resources in all the countries under study. This, for example, is the case in Mauritania where the provision by research of material to assist in decision-making has led to the promulgation of Decree 2000-024 on a fisheries code based on the CCRF.

Even if the CCRF does not appear to have had a major impact on multidisciplinarity within the research teams, nor on the level of social science skills available to them, it nevertheless is evident that it has further encouraged participatory approaches, with greater consideration of the human dimension in research and development activities. However, it should be noted, that for the time being there is no mechanism permitting a correct evaluation of CCRF's impact on fishing in general and fisheries research in particular.

The **negative effects of the PIPs** which have affected the SLs of fishing communities are:

(a) Disappearance of support services to the fisheries sector or abrupt dropping of some functions at a time when the fishing communities were insufficiently organized to take over. This reflects the present reality observed in most countries concerned by the study. Professional organizations only existing in name, are very fragile, without any solid basis and possess little negotiating capacity. They handle issues of supply of factors of production, funding of activities (credit), marketing.

Such discrepancies reflect the poor Government commitment to preparing a hand over, which has had an effect on communities' SLs by affecting their capacities: difficult access to credit, drop in purchasing power (inflation), problems in supplies of factors of production, low level of access to basic social services (health, education....)

(b) Reduction in Government investment capacities for the satisfaction of certain social needs (health, education, roads ...) for artisanal fishing communities. This situation is due principally to the fact that Governments are subject to structural adjustment programmes and have several priorities which cannot all be achieved because of a lack of financial resources.

(c) Government inability to effectively control prices, thus leading to price rises in factors of production and inputs. In most countries, this factor has had adverse effect on the financial capital of fishing communities, all socio-professional groups (fishermen, wholesalers, processors, mechanics, producers of gear, boat owners....).

(d) Institutional instability of support structures in the fisheries sector. Public institutions (research and support structures) have embarked on restructuring exercises in a bid to achieve efficiency and enhanced ability to undertake their new functions. This has caused institutional instability which has

weakened the capacity of some institutions (problems introducing a policy of staff promotion, unstable policies on activities).

In addition to these structural adjustment policies, other sub-regional monetary policies such as the devaluation of the CFA franc (CFAF) have had deleterious effects on the SL of fishing communities. The devaluation of the CFAF in particular contributed to an increase in production costs, simultaneously provoking a fall in purchasing power of the artisanal fishing communities.

Finally, the effect of some national policies on SLs of fisheries communities needs to be highlighted. This is the case for example, with the policy of centralized decision-making in the fisheries sector in Nigeria, which risks the use of inappropriate regulations, far removed from the reality on the ground, in the grassroots communities.

5.2 PIPs and their effects on fisheries research

Just as for the fisheries sector in general, macroeconomic policies have had various effects on fisheries research.

The **positive aspects** have been primarily:

(a) Restructuring within research institutions with the aim of improving their efficiency and promoting development-focused research. It is with this consideration that some institutions have changed their status from that of a public administrative establishment (PAE) to public scientific and technical establishments (PSTE) thus rendering management more flexible and facilitating the introduction of incentive measures for outputs and for directing research towards development needs. This is the case with institutions such as IER and ISRA to which CRODT is attached.

(b) The creation of exchange mechanisms with users, thus permitting them to participate in the selection of priorities for research. Although this might appear limited, the case of regional committees of users of research results (RCUs) in Mali should be noted, even if it is a global mechanism implemented by the IER to ensure linkages with users. Furthermore, it is through such a mechanism that partnership between groups of processors was established (via the RCU) and research to improve the extraction and conservation of «*Tinéni*» oil effected.

The **negative points** are those relating to the following aspects:

a) Low priority rating given to fisheries resources in the area of financial resource allocation. This situation, experienced in almost all the countries studied (with the exception of some countries like Mauritania) is due to the fact that the governments fixed new priorities in view of structural adjustment, relegating research to the background.

Consequently, and for some countries like Mali, the government contribution does not exceed 30 percent (mainly operational costs – salaries and other current charges), a major part of funding (at least 70 percent) coming from external sources. Such a situation limits intervention capacities and in some cases hinders a clearer focusing of actions on community needs.

(b) Institutional instability linked to restructuring, with its consequences on the performance of some institutions. In this way, the frequent changes of ministerial or institutional supervision has prevented improvement in performance (difficulties in promoting a true policy for strengthening human and financial resources...) of some research institutions, as has been the case in Nigeria.

5.3 Priority given to the fisheries sector

Generally speaking, the actions developed in the area of fisheries fall into the framework of priorities identified by countries under poverty alleviation. This reflects the importance that the policies give to artisanal fishing in poverty alleviation among the disadvantaged groups. This vision must however, be qualified by the fact that in some cases the reality leans more towards industrial fishing as a source of foreign exchange. This is the case, for example, for Guinea where arrangements or investments for industrial-scale fishing are clearly highlighted in the strategic document on poverty alleviation (SDPA). In the «draft» of this strategic document, in Cameroon, only superficial reference is made to artisanal fisheries.

This paradox is also highlighted by policies related to fisheries agreements and the difficulties of applying the regulations (a situation experienced particularly in Guinea) with consequences on the SLs of artisanal fishing communities:

(a) Strengthening fisheries over-capacities (national job reduction and its effects)

(b) Dysfunctionality of the inter-fisheries management system (spatial competition between industrial and artisanal fishing with frequent conflicts and damage to gears). Thus, in some countries such as Nigeria, capital losses linked to this threat within the community has been evaluated at 135 000 Naira per fishing season, this loss rising to between 252 000 and 336 000 naira per month during a good fishing season.

(c) Disorganization of product marketing mechanisms (products of national boat owners are less competitive on the international market).

As regards fisheries research in particular, the major asset is that most of the research activities are already part of the priorities identified in the strategic research plans approved by political authorities.

However, the so-called priority given to the fisheries sector under poverty alleviation, cannot be seen anywhere if one looks at resource allocation levels. As underscored earlier in Part 4, with the exception of Mauritania, governments have made little effort to put in place a sustainable funding mechanism for fisheries research institutions.

This instability or uncertainty in financial matters is a common concern observed within agricultural research institutions in Africa.

Experiments are presently on-going in some countries like Senegal with the National Fund for Agricultural and Agro-allied Research (NFAAR). Fisheries research activities are eligible under this fund, and there is work being done with a view to ensuring sustainability of funding and to link this with the real research needs expressed by users and development priorities. They are nevertheless competitive funds.

6. FISHERIES RESEARCH, PIP AND CONTRIBUTION TO SLS OF ARTISANAL FISHING COMMUNITIES

6.1 Contribution of fisheries research to the SL of communities and to PIPs

An analysis of the results obtained demonstrate that fisheries research, despite low resource allocation from which it suffers in most counties, contributes directly to livelihoods of artisanal fishing communities. This contribution which has been enjoyed in all the countries which are part of this study is articulated through three main categories of services provided by fisheries research institutions.

Generation of diverse innovations and knowledge permitting the improvement of income and general living conditions in communities. The technologies generated cover several areas of community concern: rational exploitation and management of fisheries resources (fishing gear and other selective fishing techniques), processing and conservation of fish (low-energy, low-cost smoking techniques). Box 5 gives an example of the contribution of fisheries research to the improvement of the SLs of inland fishing communities.

Box 5: Example of contribution of fisheries research to policies and to the SLs of communities (Case of Mali)

Technologies and knowledge leading to the establishment of local rules on fisheries resources management (Local and regional fishing agreements in 5th region, in force since 1988):

i) Techniques and fishing gear in the Niger river and its tributaries.
ii) Fishing Observatory in the Inner delta of Niger.

Technologies leading to income enhancement of communities and their associations (co-operatives):

i) Techniques for fish farming in coastal waters.

ii) Pond fish farming techniques.
iii) «Chorkor»Oven-smoking of fish has given rise to an increase in the selling price of smoked fish (from 500 to 1 250 CFAF/Kg).
iv) Extraction and conservation techniques for «Tinéni» oil have led to improved product quality and longer length of conservation from two months to two years.

Various technologies and knowledge leading to political decisions on regulation and development:
i) Local and regional fishing agreements in the 5th region in 1987.
ii) Decree N°95-032/PRM and Application Decree.
iii) Master Plan for the development of fisheries and fish farming in Mali in 1997.
iv) Selingué Lake Fishing Agreement, currently being drafted.

Source: Mali national report
1US $ = 740 FCFA

As regards the generation of technologies in particular, a difference in areas of activity seems to be appearing between the public and private research institutions. In most cases, the private research institutions (the NGOs namely) invest more in research activities or research action linked to community livelihoods, whereas the public institutions are those also considering aspects of basic research which, despite their contribution to the SLs, require more time for implementation. Boxes 6 and 7 illustrate services offered by these two categories of institution.

(b) Links between fisheries management and improvement in SLs. Some believe that this is the main point of departure for research. The data presented in the six studies are insufficient to make an in-depth analysis of such an assumption here.

(c) Building technical capacities in the communities. This technical training is designed to permit better value to be derived from innovations developed. The commitment of fisheries research institutions to technical capacity building compensates for the low level of involvement by agricultural extension institutions in this field.

This notwithstanding, it should be noted that the role of fisheries research institutions in organizational and institutional capacity building in fishing communities is still marginal compared to other services provided.

Providing various advice (advisory-support) to communities for the selection of the best operating techniques and appropriate inputs.

Box 6: A public agricultural research institution: The Institute for Agricultural Research for Development (IRAD) of Cameroon

Type and Mandate:
i) A public administrative establishment (PAE) with a national mandate for programming and implementation of research in diverse areas: agriculture, environment, agro-allied, agro-industrial, fisheries.
ii) Institution under the double supervision of the Ministry for Scientific and Technical Research and the Ministry of Economics and Finance (financial supervision).

Subjects broached in the area of fisheries (artisanal and industrial):
i) Resource evaluation
ii) Biology and dynamics of species harvested
iii) Development
iv) Conservation of balances in eco-systems
v) Socio-economics of fisheries
vi) Technology of fish processing
vii) Fish farming

Scientific staff (discipline): 07 researchers out of a total of 230 in the institute:

i) Biology: 03
ii) Socio-economics: 01
iii) Fish technology: 01
iv) Pollution: 01
v) Aquaculture: 01

Links with policies and communities (Users):

i) Absence of a formal framework (institutional platform research – policy – fishing professionals)

Capacities in development research:

i) A regional institution with centres and research stations covering the agro-ecological regions of the country.
ii) Some partnerships with the Ministries in charge of extension work and with some development organizations. (SOWEDA).
iii) Absence of an enabling environment for demand-driven research (poor motivation for developing the participatory approach).

Source: Cameroon national report

Box 7: A Non-governmental organization conducting Fisheries Research: CREDETIP – in Senegal

Type and mandate:

i) A sub-regional non-governmental organization (NGO) (Burkina Faso, Côte d'Ivoire, Gambia, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Senegal, Sierra Leone) - institution with a mandate for research and development.

Subjects broached in the areas of fisheries (artisanal inland and inshore fishing):

i) Support for the development of exchange of artisanally processed goods in local and subregional markets.
ii) Promotion and utilization of efficient technologies.
iii) Diagnostics, institutional support, and research and development.

Personnel (discipline)

Economy and management: 01; Sociology: 01; Social services: 01.

Links with communities and policies:

i) Involvement in numerous exchange and decision processes in the field of fisheries: National Quay Management Committee, national consultations on fisheries.
ii) Preparation of themes (Bonga, Economy and Humanism, Samudra, Fisheries and Development, Galgui).
iii) Support for the emergence of professional fisheries organizations (CNPS).

Development research capacities:

i) Existence of an output-based incentive system for staff.
ii) Development of various partnerships with public research and funding institutions (CRODT, ITA.).

Source: Senegal national report

As regards PIPs in particular, it goes without saying that it is the field in which fisheries research has contributed most in the different countries, despite the slim resources often allocated to the sector.

Some research institutions like IMROP have even been established with a mandate to provide the supervisory Ministry facts to assist in decision-making. The example of the contribution of Fisheries

Research to policies, institutions and processes is illustrated in Boxes 5 and 8 with the cases of Mali, Senegal and Nigeria.

Box 8: Examples of contribution of social sciences
Case of Nigeria: Contribution of socio-economic research to political decision-making

The provision of knowledge and technologies has assisted decision-making in the area of management and regulation of the exploitation of fisheries resources:

i) Recommendations made by the Nigerian Institute for Freshwater Fisheries Research (NIFFR) for the use of a "3 inch. Mesh-Size" led to the drafting of regulations on inland fishing in 1983.
ii) Recommendations made by the Nigerian Institute for Oceanography and Marine Research (NIOMR) on fishing zones taken into account during drafting of decrees on fisheries in 1992.
iii) The German Agency for Technical Cooperation (GTZ) in collaboration with NIFFR was behind the review and signing of the law promulgating sustainable management fisheries resources of Lake Kainji in the States of Niger and Kebbi, and in other water bodies.

Case of Senegal: Contribution of socio-economic research

The generation of a critical mass of knowledge and technologies contributed to the SLs of communities and provided assistance in decision-making:
i) Knowledge about costs and revenues in artisanal fishing enabled the identification of factors impacting the profitability of investments in this subsector.
ii) Knowledge about shortcomings in the management of purse seiners and long liners.
iii) Information on constraints related to rational landings. This led to the preparation of marketing aid projects.
iv) Monographs on major distribution markets. This permitted the identification of key factors in product price formation and the socio-economic characterization of marketing officers.
v) Information on constraints hindering the development of the processing sectors.
vi) Bi-annual statistics from fishing units and fisheries-related infrastructures.
vii) Information on cephalopod based fisheries. This led to the establishment of a data bank on major macroeconomic aggregates dating back to the origins of this type of fishing in Senegal.
viii) Information on macroeconomic policies. This informed decision-making regarding increased government support to the fisheries sector.
Source: Nigeria national report and Senegal national report

In all the participating countries, fisheries research played a role by contributing technologies and information necessary to enable politicians to take decisions in matters pertaining to the regulation of the exploitation and management of the resource and the fisheries. This has often been reflected in concrete terms by the passing of laws, decrees or various texts and also through clarifications given during negotiations of fishing agreements.

6.2 Particular contribution of social sciences

The scientific disciplines, which are grouped under social sciences, are, for example, sociology, economy, anthropology, law, political and institutional analysis. Each of these disciplines has potential influence on decision-making in the area of fisheries management and/or livelihoods improvement. But the capacities in social sciences of research institutions in the countries studied are generally limited.

The importance of social sciences (taken in the widest sense of the term considering all socio-economic aspects) in fisheries research institutions varies depending on the country. This variability takes into account situations in which social sciences seem to play a background role (as is the case of Cameroon), and situations where, despite relative marginalization, the social sciences make a valuable contribution to the research mechanism (this is the case for Senegal).

Generally speaking, and whatever the situation, social sciences have gathered an enormous amount of information on wide range of areas: fishery production systems, statistics, product marketing, product processing. These achievements have not only led to direct improvement in the living conditions of the communities, but have also contributed to decision-making at the policy formulation level.

An illustration of the contributions of social sciences is found in Box 8 with the cases of Nigeria and Senegal.

6.3 Links between Fishery Research (FR) and the needs of artisanal fishing communities: partnership between fisheries research and artisanal fishing communities

In the framework of this study, some examples of partnership between research and the fishing communities have been analyzed. From the point of view of procedure, such partnerships are generally built around an expressed "request" from the users and on the basis of which organization is put in place by the research institution with a view to providing an appropriate response.

In the framework of this study, the few partnership cases analysed (see details in Annex 4) give rise to the following:

(a) The "requests" or needs, basis of partnerships often come through intermediary organizations represented by projects or development societies (case for example of SOWEDA in Cameroon, OPM in Mali or PNBA in Mauritania) NGOs (case of SAILD in Cameroon, OCEANIUM and UICN in Senegal), or even research institutes. This situation encountered in most countries partially indicates the low capacities of professional fisheries organizations to clearly formulate a request and to contract services.

(b) Some partnerships have been built on the basis of clearly expressed "demands" of the users. This is the case of Mali with the RCU on "Tinéni" oil extraction and conservation techniques in Nigeria in collaboration with NIFFR – communities for the development of low-energy technologies for smoking and drying of fish, and from Senegal with the collaboration of CREDETIP – CNPS for the development of the «mutualist» system, the partnership CNCR-MANOBI for the establishment of information systems on markets. These partnerships illustrate situations where the communities through their professional organizations possess a real capacity to analyse their environment, production and negotiation with a view to contractualization of services. Box 9 illustrates the concrete examples of this type of partnership in Nigeria and Senegal.

(c) But in most cases, there are very few direct partnerships Research – Communities in the fisheries sector. This situation (experienced in some countries like Guinea) reflects the existence of negative factors, inter alia:

> i) *The low capacities observed within professional fisheries organizations, more especially, at the grassroots level.* More often than not this is due to inadequate organizational, institutional, strategic capacities (ability to analyse and develop a vision for the future), and for negotiation with other partners. This was all exacerbated in many countries by the extremely high rate of illiteracy within the artisanal fishing communities.
>
> ii) *The absence or inadequacy of national development research policy.* This situation observed in the area of fisheries appears somewhat paradoxical in some countries like Guinea where "Demand driven research" is already in full swing at the level of agricultural research. (This is case with numerous partnerships and service contracts between the Institute for Agronomic Research in Guinea (IRAG) and professional organizations of producers such as the Federation of Fouta Djallon Farmers (FFDF) or the National Federation of Coffee Planters of Guinea (NFCPG).
>
> iii) *The inadequacy and, in some cases even absence, of formal mechanisms by which fishing communities ensure management of research activities.*
>
> iv) *The absence of appropriate mechanisms for the dissemination of fisheries research results:* extension mechanisms often absent in the area; traditional extension structures taking little account of the concerns of the fishing sector; perception on the fact that it is extension work

that is to assure linkages with the users. To this should be added human resource constraints at the research level.

Box 9: Examples of partnership Research – Fishing Communities

Case of Nigeria: Partnership between NIFFR and the fishing communities along the Kainji and Jebba Lakes for the introduction of solar dryers and ovens for smoking fish.

Relevance of the operation

i) A request from fishing communities.
ii) The request constitutes a real concern of communities confronted by the degradation of forestry resources, and the reduction in the availability of firewood.

Relevance of the approach

i) A participatory approach was used at all stages of the process.
ii) The research institute (NIFFR) played the role of an observer and a support role, thus giving the communities the precedence.

Impacts and sustainability

i) The partnership led to the development (adaptation) of technologies for cheaper processing with much lower consumption of firewood.
ii) The appropriation of the results of the partnership by the communities constitutes a sign that it can be replicated in other contexts (especially in the Sahel) where the problem of availability of firewood is acute.

Case of Senegal: Partnership between the CREDETIP, CNPS and the CMS for the development of "mutualism" to the benefit of the CNPS

Relevance of the operation

i) The request comes from a well organized, well-structured professional organization.
ii) The request reflects a need felt by the members of the CNPS for funding of their fishing activities.

Relevance of the approach

i) The requesting professional organization has played an active role in the process of this research i.e. action, providing training and sensitisation for GIEs.
ii) Other actors (CREDETIP, CMS) have played a support role, namely, as regards IEC (Information, Education and Communication), and dissemination of results of the research-action.

Impacts and sustainability

The results of the partnership have led to autonomy of the CNPS in the crucial area of funding its fishing activities.

The operation is sustainable because it is based on a priority need of the profession. It can be repeated in contexts where professional organizations possess real capacities for organizing and mobilising its members.

Sources: Nigeria national report and Senegal national report

6.4 Factors influencing the contribution of fisheries research to the SLs of communities, and policies

Despite the performances recorded in most countries in the study, fisheries research still encounters enormous difficulties limiting its contribution to the improvement of livelihoods of fishing communities and to policies.

Although the nature and the importance of these limiting factors vary from one country to another, the general analysis reveals the following:

(a) Factors relating to institutions and policies. These have been identified as being the most important and include, inter alia:

i) The absence or inadequacy of sustainable funding mechanisms for research institutes. The excessive dependence of institutions on external funding diminishes the Institution's ability to act and also affects the focus of some research enterprises (often far removed from the real concerns of the communities).

ii) In many countries fisheries research institutes are given a low level of priority. This leads to infrastructural, human resource, material and financial inadequacies which affect the responsiveness of research institutes to requests from the artisanal fishing communities.

iii) In some cases, the inappropriateness of the constitutions of fisheries research institutes vis-à-vis concerns about development-focused research. Provisions under the PAE do not permit the encouragement of an entrepreneurial approach nor ensure flexibility in management. This constitutes a serious limitation for some fisheries research institutes.

iv) The inconsistency of some policies, namely those relating to fishing agreements. This sometimes favours further over-capacities in fisheries, the dysfunctionality of the system of inter-fisheries management (spatial competition between artisanal and industrial fishing), breakdown of the marketing mechanism.

v) The low-level, even absence, of development of linkage mechanisms between **Research**, **Communities**, and **Policies**.

vi) The institutional instabilities observed within some research institutes weaken their organization and makes the establishment of a coherent research policy impossible.

vii) Absence of specific relay structures with a mandate to promote the exploitation of fisheries research results for the benefit of fishing communities.

(b) Organizational problems within communities

This concern, found in almost all countries, does not facilitate the adoption of development-focused research.

Similarly, and following the disengagement of the government from certain functions, the inability of professional fishing organizations to manage issues of funding, supply of factors of production, marketing of products, does not aid in the development of technologies developed by research.

Another important reason for the ineffective direct partnerships between **Research** and Fishing **Communities** is also due to the poor organizational capacity of the latter.

7. LESSONS AND IMPLICATIONS

7.1 Key Lessons

From the results obtained in the course of this study the following main lessons can be drawn:

(a) Positive and interesting trends within research institutions

Beyond the shortcomings documented, it cannot be denied that policies have during the past few years, underscored improvement in the effectiveness of research institutions (including those related to fisheries research). One of the notable facts induced by the PIPs has been the transformation of certain institutions into legal structures (PSTE), which has improved their effectiveness and ensured the promotion of an entrepreneurial approach (system of promoting officers on the basis of output) and development-focused research. While their current structure still appears inadequate, especially at the level of fisheries research institutions, the trend seems encouraging.

(b) Encouraging local regulations for management of fisheries resources

Even if this trend is not generalized it should nevertheless be mentioned. This is the case, for example, with local agreements drawn up in the 5th region in Mali with the direct involvement of the communities through their professional organizations and local authorities (territorial collectivities). This is an approach which is more empowering and guarantees the implementation or application of rules on the exploitation and management of resources.

(c) Low capacity of professional fishing organizations

The low capacities of professional organizations is a concern noted in most countries (with the exception of Senegal). Compared to the dynamic change in other sectors of activity (agriculture, livestock breeding) this situation seems disturbing and reflects the low level of attention allocated by fisheries support bodies in the field.

(d) Contribution of fisheries research to the SLs of communities and to PIPs

Results show that despite certain objective constraints, fisheries research through innovations and knowledge generated, has been a major contributor to fisheries livelihoods. The most remarkable contribution of research concerns the provision of decision-making assistance at the political level. Such a contribution should be enhanced through the establishment of institutional platforms between Research, Professionals and Policies, as well as the improvement in capacity for action of the research institution.

(e) Possibilities for capitalizing on socio-economic research in the framework of capacity-building for fishing communities.

Beyond knowledge and innovations for decision-making, socio-economic research could also be used profitably for the generation of organizational and institutional innovations to boost the capacities of professional fishing organizations. Similarly, they could make an interesting contribution to the enrichment of the SL approach and to the search for methods or mechanisms promoting development-centred research.

(f) Low priority given to fisheries research in some cases

This illustration has been made on the basis of resource allocation to the sector. This also reflects the problem of prioritizing among various issues which is a process that several countries, subject to structural adjustment, are currently encountering. This question raises the basic concern of promoting sustainable funding mechanisms. This is not a new issue given the current experiments underway in the area, namely in Senegal with the FNRAA. It is however a thorny issue for policies at country level.

Thus, beyond the procurement of funds, it is also necessary to seek appropriate mechanisms to attain a deeper involvement of users, both in the direction and funding of research activities. Experiments are also on-going on the issue of the emergence of semi-private institutions where users hold the major capital share (case for example of CNRA in Côte d'Ivoire). However these are mechanisms that cannot be applied in a blanket fashion but whose common denominator remains the existence of professionals who are sufficiently organized and who possess the appropriate capacities (including financial capacity).

(g) Difficulties of fisheries research institutions in developing a demand-driven approach among the fishing communities

Most countries have experienced difficulties with the development of a demend-driven research agenda. As indicated earlier, considerable efforts have been invested but much work remains to be done in this area of fisheries research. This often appears paradoxical if one compares it to what is happening in the agricultural research field. This situation is often linked to the youth of certain fisheries research institutions and the reasons for their establishment, (in some cases, the desire was simply to provide useful information to the technical supervisor to assist in decision-making). This partly explains the inadequacy of a policy to promote a participatory approach as well as difficulties in introducing frameworks or mechanisms to facilitate partnership with users.

(h) Very few direct partnerships between research and users in the fisheries sector

This situation has been noted in most of the countries and is largely due to the poor abilities of professional community organizations and the climate within certain research institutions (absence of incentive structure) which is not conducive to the establishment of such partnerships. However, analysis demonstrates that it is the capacities of the professional organizations which constitute the determining factor here. The examples analysed show that the professional organizations with the appropriate capacities are even in a position to contract various services from the private sector, as is the case with professional organizations in Senegal.

(i) A lack of mechanisms or support measures for the communities to capitalize on results of fisheries esearch

This situation, experienced in most of the countries, reflects not only the unsuitability of some current measures of dissemination for taking into account the specific needs of the sector, but also the absence of a global policy in the area.

(j) Incoherence of some policies introduced and affecting the livelihoods of the communities

This is illustrated in some countries by the need of the government to promote artisanal fishing as a means of effectively alleviating poverty on the one hand. While on the other, the concern of these same governments to rake in the maximum amount of foreign exchange through industrial fishing. This problem is clearly an issue in some countries and is illustrated by the dearth of attention given to artisanal fishing in spite of its major contribution to income generation and rural job creation. There is therefore a need to strike a balance, with a view to encouraging the contribution of artisanal fishing to poverty alleviation strategies

7.2 Concrete actions to improve the contribution of fisheries research to artisanal fisheries

Fishers livelihoods

Table 3 summarizes the main actions foreseen at country-level with a view to improving the contribution of fisheries research to the SLs of communities and to policies.

An analysis of these actions reveals a number of concerns, which, if taken into account, will improve the contribution of fisheries research to artisanal fishing communities livelihoods.

The study only covered a sampling of six out of 25 countries associated with SFLP. Theses ideas for action are therefore based on the issues arising from the sample survey but constitute a basis for the positioning of each country, each on the basis of its own context and realities. Four major categories of priority actions can be identified.

(a) Building capacities of fisheries professional organizations (organizational, institutional and especially strategic capabilities)

This is a vast area of intervention already having been examined and having led to the preparation of national action plans to strengthen farmers' organizations. The activities foreseeable in the framework of SFLP will therefore be constrained by the existing process (this issue has already been discussed by some NCU like Mali which was the basis for success in all fisheries-related activities). Activities in the field would touch upon practical training in particular include study tours and exchange-visits between professional organizations. Issues relating to illiteracy are important as they determine the basis for capacity-building of professional organizations. This constitutes one of the primary responsibilities of the government and further studies in this matter are required.

(b) Building partnerships between research and fishing communities

This area of intervention determines the importance of the contribution of research to fisheries livelihoods. Activities foreseen in the field are multiple and comprise:

i) The creation of an enabling environment within research institutions promoting the conduct of demand-driven research. This takes into consideration aspects relating to the system of incentives to researchers and evaluation criteria for output. In some cases, namely within institutions developing along the lines of the PSTEs, this type of issue is often taken into account. However, it must be noted that these are issues implicating decision-makers in each country; the programme response at this level could be to continue reflection, encouraging a qualitative development of fisheries research institutions in all countries.

ii) Building the capacity of research teams in participatory approaches to development. Actions have already been initiated by the Programme in this area; here the idea is to strengthen such initiatives by widening the target group for such training (to representatives of professional organizations) and contributing to the preparation of training manuals in this area.

iii) Creating mechanisms by which fishing communities can influence research programmes. Such mechanisms are part and parcel of the restructuring that is on-going or completed in some of these institutions. Practical experience, however, demonstrates that the drawback of such measures resides in the non-sustainability of funding for the running of operations. A relevant activity in this area is to seek sustainable mechanisms for funding these arrangements while at the same time guaranteeing their functionality and appropriation by the actors involved.

iv) Encouraging participatory development activities in partnership between Research and Fishing Communities. The results of the study show that some research institutions are not used to, or prepared, to operate within a demand-driven set-up. The same is true of professional organizations whose capacities do not allow for the establishment of such partnerships. Thus the development of pilot initiatives in each country gives an opportunity to initiate training both within fisheries research institutions and at the level of professional association level. In some countries, the process of contracting out research will boost initiatives already underway. The promotion of such partnership operations has already been undertaken in the agricultural sector and has given producer organizations the opportunity to familiarize themselves with request and research contract services.

(c) Building capacity in fisheries research institutions

As outlined above, this issue goes hand in hand with the priority given to this sector and the issue of the need to focus these institutions on development needs.

As regards the experiences noted throughout this study, some key activities are to be expected:

i) Encouragement of sustainable mechanisms for funding research. This issue is also of relevance to agricultural research as a whole. The fisheries sector, however, does have a certain number of assets: the fact that research contributes directly to policies is a factor for sensitisation of decision-makers on the issue; similarly, the fact that fisheries produce is, to a large extent, evaluated in monetary terms also offers possibilities of interesting the profession on this subject.

Furthermore, in addition to on-going experiments in some countries such, as Senegal, the introduction of other areas of reflection involving both decision-makers and the professionals also seems relevant. As a basis for such reflection, it is important to undertake other activities such as the contribution of research to the SLs of communities, as well as an impact evaluation related to the contribution of research to PIPs. The framework of this study has not been wide enough for a consideration of these factors, which are nevertheless important both for policies and the profession. These evaluations could be conducted in each country.

ii) Boosting the scientific capacities of research institutions (human and material resources). This is an issue inseparable from that of sustainable funding of research institutions With particular regard for human resources and taking into account the situation observed within research institutions, particular attention will have to be given to enhancing social science skills (socio-economic aspects) and a participatory approach.

(d) Strengthening the contribution of research institutions to policies and to SLs of communities

Several activities are foreseeable but those relevant to the results of this study are the following:

i) The creation of an institutional platform for linkage between Research, Policies and Profession (Communities). In countries where professional organizations (PO) have sufficient capacity as in Senegal, such mechanisms have been established by PO lobbying. It seems from these experiences that the sustainability and functionality of such measures depend to a large extent on the existence of strong POs. Just as for the restructuring of research institutions, this is an issue implicating primarily the main actors concerned in each country. As for the concern for improvement in the contribution of research institutions to decision-making at the political level, the Programme action could contribute to the sensitisation of national authorities on the issue as well as to awareness in the area, etc. Similar to partnership mechanisms Research – Communities, the search for sustainable systems could become a relevant concern.

ii) The promotion of mechanisms to capitalize on research results with a view to improving the SL of communities. The unsuitability of actual measures for dissemination justifies the relevance of such an activity. Beyond institutional aspects pertaining to decision-making at national level, programme action could cover the following aspects: capacity-building for research teams in drafting techniques, presentation of research results to communities and decision-makers (including local authorities), support for the establishment of mechanisms to exploit results (information systems on innovations, for example).

Table 3. Synthesis of major actions envisaged at country level

Actions	Country					
	Cameroon	Guinea	Mali	Mauritania	Nigeria	Senegal
1. Creation of an institutional platform Research – Policies - Communities	X	X	X	X		
2. Capacity-building (capacities for negotiation, institutional, organizational, for analysis of their productive environment) for organizations or institutions linked to fishing communities: professional organizations; agricultural associations; local authorities; unions, etc.	X	X	X	X	X	X
3. Building researchers' capacities in participatory approaches and institutional capacities to develop research in social sciences.	X	X		X	X	
4. Establishment and strengthening of mechanisms by which fishing communities ensure directing of research programmes: participation in definition; and focus.	X	X	X	X		
5. Promotion of sustainable funding mechanisms for research activities.	X	X	X		X	
6. Strengthening of partnership between research service providers: development of a national system of fisheries research.	X					X
7. Creation of an enabling environment (policy) promoting the status of the researcher and assuring the encouragement of development centred research (promotion and strengthening of Research-User partnerships).	X	X	X	X		
8. Establishment of institutions or supervisory structures for fishing communities and dissemination of research results.		X				
9. Encouragement of research contracts.			X			
10. Introduction of a strategy of communications between researchers and users. More information on research and dissemination of results.		X		X		X
11. Encouragement of micro-finance (credit) with a view to enhancing the exploitation of technologies by artisanal fishing communities.				X		
12. Development of a national strategy to promote artisanal fishing: national forum on holistic planning on the future of artisanal fishing.					X	
13. Decentralization of the decision-making process with a view to real participation of grassroots communities.					X	
14. Establishment of structures to disseminate and exploit research results.		X			X	X
15. Promotion of a policy on the development of human resources within fisheries research institutions: recruitment of specialists corresponding to development and training needs.		X	X		X	X

7.3 Recommendations

This study on the contribution of fisheries research to fisheries livelihoods led to the identification of a certain number of positive facts and opportunities that would enable research to meet the needs of users. Furthermore a number of shortcomings have been identified as limiting to the contribution of fisheries research to the SLs of communities. Regarding these shortcomings, ideas for actions have been identified. In the same vein, some recommendations are necessary in order to attain the objectives of the study.

Nevertheless, it is obvious that the Programme cannot respond to all concerns. Therefore, the recomendations presented here are the priority issues upon which the Programme could act in partnership with each of the countries involved.

1. The publication of a synthesis of this study and its dissemination by SFLP in the 25 countries associated with the Programme. Results could also be published on the web.

2. Study results could also be disseminated via subregional seminars. Two to three of these could bring together representatives of countries, which have not participated, in the study (research, representatives of the profession, NGOs, Private sector, support and dissemination services….). The aim of these workshops is to analyse the implications of such a study in terms of actions to be undertaken to improve the contribution of research to SLs of fishing communities. These regional workshops could be held in partnership with other subregional or international networks.

3. Support for experimentation of demand-driven research systems in some countries. This consists in promoting (by placing funds) pilot partnership actions between Research and Community bodies for the participatory development of technologies (based on the expressed needs of users during the study (see country reports).

4. Support for capacity building in research institutions in the area of participatory approaches. Such support could be organized directly in the countries, where a need is expressed.

5. Capacity-building in research institutions in the area of communication with the aim of ensuring a better exploitation of fisheries research results.

6. Capacity-building for countries in analysing impact of fisheries research. To this end, a partnership could be developed with regional institutions like the Inter-State Committee for Drought Control in the Sahel through the Sahel Institute.

7. Support to government for national initiatives aimed at awareness-raising, promoting a system of development-centred fisheries research, and finding sustainable funding mechanisms for fisheries research.

8. FOLLOW-UP TO THE STUDY

In order to better exploit the results of the study, different activities have been identified for implementation at various levels. Responsibilities have also been defined with a view to facilitating implementation.

8.1 Regional level

Priority actions defined at this level are the following:

(a) Editing, publication and distribution of the synthesis of the study in all countries

Objectives: Foster wider awareness of the results of the study in all countries, both those involved in SFLP and others.

Strategies: Editing and publication in various formats: Document on paper, CD-ROM and posted on the Web.

Period/Time Frame: July – September 2002.

Responsibility: USR – Cotonou

(b) Sharing lessons of the study in other countries associated with the Programme by organizing two to three subregional seminars.

Objectives: To share study results and consider the implications in terms of actions to be undertaken to improve the contribution of research institutions to SLs of fishing communities. These workshops could be held with the support of subregional or international networks.

Participants: Representatives of the 19 other countries (research, support and dissemination structures, decision-makers, representatives of professional fisheries organizations, NGOs, individuals, etc.).

Duration of each seminar: Two (02) days.

Period/Time Frame: September – October 2002.

Responsibility: USR – Cotonou.

(c) Identification of priority actions to be implemented in different countries

Objective: Enable the implementation of priority actions identified in the framework of the study.

Strategies: This activity will comprise two stages: the first being devoted to the choice of priority actions for implementation by each country and the second focusing on arbitration (on the basis of means and concerns) at the regional level by the RSU and the country-interest groups.

Period/Time Frame: October – December 2002.

Responsibilities: USR – Cotonou.

8.2 For countries having participated in the study

The following priority actions are to be foreseen:

(a) Editing and publication of national reports

Objectives: To encourage a wider dissemination of the study results in the countries that participated in the study.

Strategies: Editing and publication as a paper document.

Period/Time Frame: July 2002.

Responsibilities: NCU of each of the six countries.

(b) Preparation and transmission of the "Note to Decision-Makers" on the implications of the study

Objective: This note, a preliminary draft of which was prepared by countries at the validation seminar, is intended to facilitate a better grasp and a correct assessment of the outcomes of the study in each country.

Strategy: It is directed at different categories of decision-makers with the intention of engendering necessary changes or transformations. These notes would therefore serve as a foundation for the identification of priority actions, the determination of strategies to exploit the outcomes of the study, and for the implementation of priority actions identified in each country by research partners.

Time Frame: By the end of July 2002

Responsibilities: Each focal fisheries research institution and the NCU.

(c) Organization of national reflection on the implications of the study

Objective: To permit the identification of priority actions for the countries and to reflect on modalities of implementation and the responsibilities of each actor. These national workshops will be an occasion to discuss the sequel to the "Note for Decision-Makers" and the strategy to be adopted.

Participants: Each national meeting will bring together actors involved in the execution of the study (maximum of 30 participants) (research, support and dissemination structures, bodies and development projects, representatives of professionals, NGOs, individuals, etc.).

Period/Time Frame: September – October 2002

Duration: Two days.

Responsibilities: NCU of each country.

9. CONCLUSION

This study was commissioned by the SFLP to respond to one of its thematic concerns. It has been designed and implemented using a participatory approach in the six countries. The interest aroused in the different countries reflects the relevance of the subject matter, which has been conveniently termed "the contribution of fisheries research to livelihoods of artisanal fishing communities". The level of commitment of beneficiary countries from the preliminary reflections on the choice of methodology, up to the collection of data and its processing, is a good illustration of the fact that the work is a response to a topical need.

The process of internal validation implemented in all the countries proved very constructive and represented a real appropriation of the results of the study. Furthermore, one of the positive factors to be considered in the outputs of the study is that it was an opportunity to forge and enhance the skills and abilities of the teams to work in a multi-disciplinary, multi-institutional team while analysing livelihoods.

From the study outputs it appears clear that research institutions indeed contribute to the improvement of livelihoods of fishing communities through the generation of technologies and information relating to their activities, the strengthening of their technical and institutional abilities, as well as the provision of all kinds of advice. Without doubt, it is at the PIPs level that research institutions have made the most significant contribution, generating knowledge and innovations that have allowed politicians to take decisions in the form of laws and decrees on regulation, exploitation and management of fisheries research.

In spite of this contribution, it has been shown that fisheries research does not recieve an appropriate level of attention in all countries. The priorities born of structural adjustment policies have constrained some Governments to relegate fisheries research to a more peripheral status. The field now subsists largely on external funding for financing. Furthermore, fisheries research has taken a lot of time to adapt and promote a truely development centred research agenda. All these are factors have limited the contribution of fisheries research to livelihoods in artisanal fishing communities. The situation has been further exacerbated by the poorly developed capacities of professional fishing organizations which, up to recent times, have been unable to handle tasks of supplies of factors of production (materials and fishery inputs), funding of activities (credit) and marketing of products.

The outputs of this study that were validated by the workshop held in Cotonou, Benin, from the 12 to 14 June 2002 (participants listed in Annex 6), constitute a basis for the strategic planning of actions in the artisanal fisheries sector and more particularly the contribution of research. Hence, several actions to improve the livelihoods of the communities have been identified, and focused recommendations formulated. Apart from the dissemination of these findings among other countries which were not involved in the study, it is incumbent upon SFLP, in collaboration with all countries, to explore possibilities of implementing the priority actions. The usefulness of this study therefore resides in the operationalization of the actions identified as follow ups to this study.

REFERENCES

Ajayi, T.O., Abohweyere, P.O., Jim-Saiki, L., Adeogun, O.A., Ogunbadejo, K.H., Ugbodu, V.A., Olaniyi, M.A. & Igun, B.O.A. (2002). Contribution of research to the improvement of the livelihoods of artisanal fishing communities in Nigeria. Part A: Coastal fishing communities. Final report, NIOMR/SFLP, 54 p.

Dansokho, D., Diarra, S., Sanogo, Y., Cissé, A., N'Diaye, I. & Diabaté, K. (2002). Etude nationale sur la contribution de la recherche à l'amélioration des moyens d'existence des communautés de pêche artisanale au Mali. Rapport final. PMEDP – UCN, 25 p. Mars.

Dème, M., Seck, I., Sarr, D., Thiam, M., Thioune, M., Dahou, K. & Sall, A. (2002). Rapport final. Les liens entre la recherche et les usagers des ressources halieutiques au Sénégal. PMEDP -DFID CRODT/ISRA, 20 p. Mars.

Dia, M.A. (2002). Etude sur la contribution de ta recherche à l'amélioration des moyens d'existence des communautés de pêche artisanale. Rapport national Mauritanie. PMEDP – CNROP, 19 p. Mars.

Diallo, M.M., Barry, T., Sandouno, M.Y., Kaba, F.M., Camara, S., Doumbouya, A., Solie, K., Camara, Y., Guilavogui, A., Camara, D. & Bah, A. (2002). Rapport final de l'étude PMEDP sur la contribution de la recherche à l'amélioration des moyens d'existence des communautés de pêche artisanale en Guinée. PMEDP – CNSHB, 26 p. Mars.

Djama, T., Njifonjou, O., Meke, S.P., Likeng, N. & Likeng, J.L. (2002). Contribution de la recherche à l'amélioration des moyens d'existence des communautés vivant de la pêche artisanale en Afrique de l'Ouest. Cas du Cameroun. Rapport final. PMEDP – IRAD, 59 p.

Hussein, K. (2001). Producer Organizations and Agricultural Technology in West Africa: Institutions that give farmers a voice'. In *Development*. Journal of The Society for International Development 44:4. December.

Hussein, K. & Zoundi, J.S. (2001a). Atelier de planification de l'étude PMEDP sur la contribution de la recherche aux MED des communautés de pèche artisanale (8-9 octobre 2001 – Cotonou, Bénin. Résultats et conclusions de l'atelier. Octobre.

Hussein, K. & Zoundi, J.S. (2001b). Méthodologie révisée pour l'étude PMEDP sur la contribution de la recherche aux MED des communautés de pêche artisanale'. Décembre.

Hussein, K. & Zoundi, J.S. (2001-2002). Rapports de mission au PMEDP, N° 1-7. ODI, UK et INERA, Burkina Faso.

Ladu, B.M.B., Ovie, S.I., Ayanda, J.O., Bankole, N.O., Omorinkoba, W.S., Sule, O.D., Alamu, S.O., Abiodun, J.A, Olaosebikan, B.D., Sule Ikoyo-Eweto, A.M., Sadiku, S., Abdullah, A.Y. & Owena, V. (2002). Contribution of research to the improvement of the livelihoods of artisanal fishing communities in Nigeria. Part B: Inland fishing communities. Final report, NIFFR/SFLP, 54 p.

Njock, J.C. (sans date). Problématique et enjeux de la recherche halieutique dans le contexte du Programme pour des Moyens d'Existence Durables dans la Pêche en Afrique de l'Ouest'. Mimeo.

PMEDP. (2000). *Bulletin de Liaison*. No.1 Septembre. FAO, PMEDP, DFID.

Zoundi, S.J., Collion M-H. & Hocdé H. (2001). Partnership between producers' organizations and Research and Extension Institutions. «In». Rondot P., Collion M-H (eds) «Producer organizations: Their contribution to rural capacity building and poverty reduction. Proceedings of the international workshop held in Washington D.C. (USA) June 28-30, 1999. Rural Development Department, World Bank, Washington D.C., USA. pp 38-45

Methodology and Outputs: Annex 1

1. The different outputs expected from each national study

i) Identification of key livelihood groups in the small-scale fishing industry in each country, their strategies and the vulnerability context within which they are evolving. Presentation of socio-professional organizations in the small-scale fisheries sector.

ii) Identification of various research providers in the small-scale fisheries sector and an analysis of their performances including key factors affecting the contribution of service providers to the SLs of communities making a living from artisanal fisheries.

iii) Case studies prioritizing lessons from experiences in collaboration between fisheries research and small-scale fishing communities.

iv) Analysis of the influence of PIPs in research on sustainable livelihoods of small-scale fishing communities and alleviation of their poverty, as well as prospects for better contribution of research to PIPs.

v) National Summary Report resuming the elements referred to below, and integrating suggestions for actions to improve links between research and users in the sector.

2. Indicative methods for data collection in the framework of the SFLP study on the Research-User link

Methods	Examples of themes or data to collect (see the analytical table)	Targets focused
Secondary data/Review of literature	All themes – identification of groups ("Livelihood groups")	Not applicable
Semi-structured Interviews (SSI) with key indicators from a pre-established interview-guide	Identification of groups, roles and research structures, case studies on liaison or partnerships, PIP, etc.	Respondents at ministerial departmental level, research institutions or organizations, representatives of NGOs, the private sector, etc.
SSI and group discussions («Focus Group»)	Details on the research systems, partnerships, PIP, etc.	Communities/Population groups using fisheries resources, processors, traders, etc.
Other PRA tools if required to obtain information on case studies. E.g. Venn Diagram, Impact Matrix, wealth classification, etc.	Case studies on partnerships, relative importance of links between institutions, impact of research on livelihoods, identification of links between the poor and research.	Communities, local organizations, livelihood groups, traders, fishermen, processors, both men and women, etc.
Methodology for analysis SFLP/Framework for analysis	PIP	Various targets

Responsibilities and roles of study partners: Annex 2
Distribution based on roles and responsibilities adopted at the workshop in October 2001 in Cotonou

RSU	NCU	National Study Team	International Consultants
1. To organize logistics for the entire study and for supervisory/support missions by international consultants.	1. To facilitate the work of the national team in charge of the study and that of international consultants throughout the duration of the study.	1. To identify and contract specialists who are to join the national team (task of the institution leader).	1. To supply and develop the global methodology and the work plan for the study.
2. To arrange contracts for national teams.	2. To follow the progress and give the results from the national team to the RSU and to international consultants.	2. To organize the implementation and/or the conduct of the study in keeping with the methodology adopted at the planning workshop held in Cotonou.	2. To advise national teams on implementation and analysis.
3. Provide and monitor necessary funds.		3. To give regular reports to the NCU and the RSU who are jointly responsible for monitoring the progress of the study.	3. To conduct short supervisory missions to each country during the course of the study (according to the planning done in Cotonou).
4. To organize regional workshops.		4. To organize supervisory missions for the international consultants and integrate them into the work schedule of the team.	4. To prepare materials and facilitate the kick-off and final review workshops in Cotonou.
5. To ensure sharing of information on preliminary and final results between country teams, the NCUs and international consultants.		5. To consider the suggestions for improvement or amendment offered by international consultants.	5. To prepare a preliminary summary report taking into account key lessons and the recommendations arising from the outputs of national teams.
6. To monitor national teams and international consultants and their progress in achieving the outputs of the study.		6. To respect deadlines and work plans adopted.	6. To finalize the final summary report, highlighting recommendations and the activities foreseen at national and regional levels (RSU programme).
7. To provide all translation services required.		7. To provide the outputs of the country study to the NCU, the RSU and the international consultants within the time frames drawn up in the work plan.	
8. To assure the general co-ordination of studies conducted in the six countries. 9. To approve, publish and disseminate the final outputs. 10. To identify and facilitate the implementation of activities which will emerge from the study.			

Overview of scientific skills available within some public fisheries research institutions: Annex 3

Discipline	Countries and Institutions								
	Cameroon	Guinea		Mali	Mauritania	Nigeria		Senegal	
	(IRAD)	CNSHB	CERESCOR	(IER)	(IMROP)	NIOMR	NIFFR	CRODT	ITA
Biology	3	10			7	2	5	8	1
Micro-biology						2	3		
Genetics – Biotechnology							1		
Ecology							8		
Socio-economy and Anthropology	1	1		1		3	6		
Sociology					1			2	
Economy					3			1	
Fish Technology	1		6			9	1		2
Pollution	1								
Aquaculture – Fish farming	1			1	1	26	5		
Geography		1				2			
Fisheries		1							
Ichthyology – Hydrobiology		4	10	2					
Zootechnics		6							
Agricultural and soil sciences		1							
Oceanography physique			18		2	3			
Geology – Geophysics. - Environment			7			3			
Energy			11						
Zoology						4			
Educational Psychology				1					
Forestry Resources				1					
Veterinary Medicine					7	1	5		
Fisheries Engineering					5	1			
Chemistry					1	2			
Bacteriology					1				
Mechanic – Engine Technology					2				
Statistics					1				
Extension work – mass communication						2			
Nutrition						3			
Land surveying						1			
TOTAL DISCIPLINES	7	24	52	6	31	64	34	11	3

IRAD: Institute for Agricultural Research for Development; CNSHB: National Centre for Fisheries Research , Boussoura; CERESCOR: Centre for Scientific Research of Conakry – Rogbanè; IER: Institute for Rural Economics; IMROP: Mauritanian Institute for Oceanographic Research and Fisheries; NIOMR: Nigerian Institute for Oceanography and Marine Research; NIFFR: Nigerian Institute for Freshwater Fisheries Research; CRODT: Centre for Oceanographic Research Dakar-Thiaroye; ITA: Institute for Food Technology (Senegal)

Partnerships - General Situation: Annex 4

Country	Case	Characteristics of partnerships or collaborations					General key points
		Type of collective structure involved in research	Origin of request	Type of links between research and the collective structures involved	Main sources of funding	Research response mode	
Cameroon	1	Key actors in PNVRA: . Extension; and . Research (IRAD).	(a) Need for collaboration identified at national level in the framework of agricultural services. (b) This is not a request generated by users.	Functional working relationships to improve the delivery of agricultural services to users.	Development partners (BAD, WB, etc.)	(a) This is an inter-departmental structure (b) Research worked directly in collaboration with extension.	(a) Most cases are indirect partnerships between research and fishing communities and via another actor (Extension, NGO, Development Society). (b) Requests for collaboration often come from support partners (Research, Extension, NGO, Development Society, etc.). (c) In most cases partnership was not concretized by agreements. (d) Most collaboration was established not with organized groups of actors (professional organizations of fishermen, women processors, etc.) but with the community.
	2	Small-scale fishing community via a development project (SOWEDA).	Development society (SOWEDA) acted on behalf of communities and submitted its request to Research.	(a) Research plays the role of service provider by offering responses (training, innovation, etc.) at the request of communities through SOWEDA. (b) No formal and direct relations between Research and the Communities.	Development partners (BAD).	Institutional response: The research institute organizes a response to the request.	
	3	A non governmental organization (SAILD) acts on behalf of the community.	Common Initiative Groups The request made indirectly via an NGO.	Here there are informal relationships between the NGO and the IRAD researchers. No institutional character.	NGO funding.	(a) No institutional response; (b) Informal response by individual researchers.	
	4	The fishing communities of Idenau, Limbe, Londji and Kribi-Mbouamanga.	Collaboration stemming from a need among credit institutions for information on the financial capacities of communities. The request does not originate from the communities.	Working relationship drawing on the communities' expertise for obtaining socio-economic information.		Research has developed a participatory approach to collection of socio-economic data.	

Annex 4 (contd): Partnerships - General Situation

Country	Case	Characteristics of partnerships or collaborations					Key General Points
		Type of collective structure involved in research	Origin of Request	Type of links between research and the colletive structures involved	Main sources of funding	Research response mode	
Guinea	(a) Absence of direct or indirect Research – Communities partnerships. (b) Many factors limiting the establishment of partnerships or collaboration. ON THE PART OF COMMUNITIES (a) Very high illiteracy rates among small-scale fishing communities: problem of communications giving rise to difficulties in understanding the part played by Fisheries Research not to mention the possibilities of service contracts. (b) Low organizational, negotiation or dialogue skills among professional organizations in the fisheries sector. Low level of openness to the outside world. No strategic vision for day-to-day management. ON THE PART OF RESEARCH SERVICE PROVIDERS (a) No appropriate mechanisms to exploit research results: presentation of results exclusively in French. No communications strategy. (b) Poor training of researchers in participatory approaches. (c) No formal framework for collaboration: mechanisms for linking and involving communities in the identification and management of research programmes and the dissemination of results. ON THE PART OF INSTITUTIONS AND POLICIES (a) No national policy on demand-driven research in the fisheries sector (paradoxical situation because such a process is ongoing in the agricultural sector). (b) Inadequacy or lack of appropriate channels of communication between research and users. No appropriate mechanisms for reporting results of fisheries research to fishing communities. (c) Over-centralization of administrative services which hampers effective action at grassroots level: absence of a framework for the expression of users' needs from research service providers; absence of support structures extension of fisheries research results. (d) No formalized document on a national policy for scientific and technical research.						

Annex 4 (contd): Partnerships - General Situation

Country	Case	Characteristics of partnerships or collaborations					Key General Points
		Type of collective structure involved in research	Origin of Request	Type of links between research and the collective structures involved	Main sources of funding	Research response mode	
Mali	1	Namaradagam fish processors.	(a) Requests originate from the fish processors. (b) Need arising from a study trip to Ghana.	A working relationship has been established between research and the fish processors – the relationship has not been formalized by a contract.	Development partners (USAID).	An institutional response has been organized given the requests of the fish processors – the research organized a response.	(a) Existence of partnership based on user requests (case for example of the research-CRU partnership.
	2	Female fish processors via the RCU (Regional Committee of Users of Research Results).	Request from users through their regional organizations (RCU).	A service contract has been established between research and the CNRA acting on behalf of the RCU.	Development partners (BM, USAID).	An institutional response was organized at the request of Users.	(b) But most partnerships are organized around requests submitted by intermediary structures (research, extension, NGO, Development projects, etc.) on behalf of the fishing communities. (c) Poor exploitation of partnership gains due to: . Low level of organization at the grass roots; . Slow transfer of skills to territorial collectivities. (d) All factors affecting: . Negotiating abilities; . Management of issues relating to supply of factors of production; . Ability to access to credit.
	3	Socio-professional organizations, territorial collectivities.	(a) The need arose from a concern to render professional organizations and local authorities more responsible. (b) The pressure or request is not from socio-professional organizations, but has been imposed by the socio-political environment.	A participatory work process has been initiated between the communities and other technical actors, the administration and civil society.	Development partners.	Institutional response from research and other actors.	
	4	The development project (OPM) acted on behalf of fishing communities.	The request emanates from the development project (OPM) (on the basis of a concern of the communities with regards to products from processed fish).	Preparation and signing of a contract between the financial partner (FED) and the project.	Financial partners (FED).	Institutional response from research and the development project.	
	5	Socio-professional associations and territorial collectivities.	The need was generated by development actors (Technical extension structures, political authorities, NGOs).	A participatory work process has been initiated between the communities and other actors.	Development partners (FAO, BADEA, BAD, UNDP, EDM, etc.).	Institutional response from different actors.	

Annex 4 (contd): Partnerships - General Situation

Country	Case	Characteristics of partnerships or collaborations					General Key points
		Type of collective structure involved in research	Origin of Request	Type of links between research and the collective structures involved	Main sources of funding	Research Response Mode	
Mauritania	1	A project (PNBA) acted on behalf of communities grouped into 8 pre-cooperative fishing units.	Request for collaboration with Research (IMROP; e.g. CNROP) came from PNBA	A formal working relationship was established between research, the communities and the project.	Development partners (IFAD).	An institutional response was given by research; the research team organized itself internally to respond to the request.	(a) Most partnerships have been based on requests or needs emanating from development projects, acting on behalf of fishing communities. (b) There is no direct partnership Research – Users based on community requests; the situation is due to: b1. The absence of a partnership policy Research – Community; IMROP being perceived as an instrument providing. decision-making assistance at policy formulation level – very little direct interaction with fishing communities. b2. Poor organization of fishing communities.
	2	A development project (ACGEBA) acted on behalf of the communities.	The collaboration initiative comes from the development project, acting on behalf of the communities – the request was not submitted directly by the communities.	A working relationship was established between Research, the Project and the communities.	Development partners (AFD).	Research is internally organized to respond to requests: institutional response.	
	3	Female fish processors via a development project supported by the FAO.	The request comes from a development project acting in the name of the communities.	Working relationship between research (IMROP) and the project in response to the request.	Development partners (FAO).	The research team organized itself to respond to the request.	

Annex 4 (contd): Partnerships - General Situation

Country	Case	Characteristics of partnerships or collaborations					General Key points
		Type of collective structure involved in research	Origin of Request	Type of links between research and the collective structures involved	Main sources of funding	Research response mode	
Nigeria	1 (NIOMR)	Fishing communities (female fish processors) (Magbon-Alade).	Collaboration was initiated in the framework of a development project.	Formal collaborative relationship between research and the communities.	Technical and development partners (CRAT, CRDI).	The research institution (NIOMR) organized an internal response to the request.	(a) Partnerships or collaboration were not often built around professional organizations. (b) In some cases this meant that the partnership spin-offs were not capitalized on, for example: b1. Low rate of loan recovery; b2. Non-application of measures relating to the use of resource-friendly fishing gear.
	2 (NIOMR)	Fishing communities (net makers, fishermen, leaders).	The request emanates from the research institution (NIOMR) acting on behalf of fishing communities (net makers, fishermen, leaders).	Participatory working relationship between research and the communities.		The research institution (NIOMR) organized an internal response to the request.	
	3 (NIOMR)	Fishing communities (fishermen and leader within the community).	The request, focus of the collaboration, emanates from a project.	Working relationship between research and the communities.	Development partners (FAO, NORAD).	The research institution organized internally to respond to the request.	
	4 (NIFFR)	Fishing communities from 2 villages (Monai and Shagunu).	Request for purchase of inputs came from fishing communities.	Working relationship between research (NIFFR) and the communities.		Research (NIFFR) organized internally to find a response.	(c) Some partnerships based on requests from fishing communities and the implementation of most of these was effected in a project framework.
	5 (NIFFR)	Fishing communities.	Request for alternative low wood consumption technologies, the focus of the collaboration comes from the fishing communities.	Working relationship between research (NIFFR) and the communities.	Development partners (GTZ).	Research (NIFFR) organized internally to find a response to the community's request.	
	6 (NIFFR)	Fishing communities around the Lake Kainji area.	Request for preservative materials, focus of the partnership comes from the fishing community.	Working relationship between research (NIFFR) and the users.	Development partners (GTZ).	Research organized a response to the request.	
	7 (NIFFR)	Lake Kainji fishing communities.	The request was submitted by fishing communities in relation to the damage caused by water hyacinth – this request was submitted via research (NIFFR).	Formal working relationship between research (NIFFR) and the communities of Lake Kainji.	Development partners (GTZ).	Institutional response of research to the communities' requests.	

Annex 4 (contd): Partnerships - General Situation

Country	Case	Characteristics of partnerships or collaborations					General Key points
		Type of collective structure involved in research	Origin of Request	Type of links between research and the collective structures involved	Main sources of funding	Research response mode	
Senegal	1	Partnership initiated by an international NGO (ENDA TM) and formulated jointly with research (CRODT) – It is not a Research – Users partnership based on a request from the latter.	The request is from an international NGO (ENDA) acting on behalf of the communities.	Implementation of a participatory work approach between different research and development institutions.	Development partners.	The main research institution (CRODT) joined partners to find a response to the request.	(a) It was more a situation of joint projects between research and the other partners than real research – fishing community partnerships built on requests from the latter. (b) Apart from research, partnerships were also established between professionals in the fisheries sector and other actors from the private sector. (c) In the case of research – fisheries professionals, partnerships requests often emanate from users, reflecting the existence of certain capacities.
	2	An international NGO (UICN) acted on behalf of fishing communities.	The request was formulated by UICN on behalf of the fishing communities.	Working relationship between the main research institution (CRODT), the service requestor (UICN) and the other actors involved.	Partners (UICN…).	Research acted as service provider and found an internal response to the demand.	
	3	Partnership between research institutions (CRODT, CREDETIP, UCAD) in the framework of a sub-regional programme – it is not a Research-User partnership.	The request is based on a research need (acquisition of scientific skills).	Working relationship between the main institutions involved and the foreign ones.	Development partners.	This was collaborative research and each research institution contributed its expertise.	
	4	Partnership initiated by research (CRODT).	Several development partnerships have submitted requests – this is not a request from users.	Working relationship between partners involved (CRODT, DOPM, OEPS).		The main partners organized themselves to find a response to the request.	

Annex 4 (contd): Partnerships - General Situation

Country	Case	Characteristics of partnerships or collaborations					General Key points
		Type of collective structure involved in research	Origin of Request	Type of links between research and the collective structures involved	Main sources of funding	Research response mode	
Senegal (contd)	5	Farmer organization (National Council for Rural Cooperation and Dialogue), on behalf of its members.	Request submitted by a farmer organization (FENAGIE-Pêche) to an individual (MANOBI).	Formal relationship between the PO and the service provider (MANOBI).		The individual mandated to provide the service found an internal response to the problem.	
	6	A farmer organization (National Council of Artisanal Fishermen of Senegal-CNPS).	The farmer organization (CNPS) submitted the request to research (CREDETIP).	Functional working relationship between research, the PO and the mutual (credit company in Senegal).	External financial partners.	(CREDETIP), the research institution organized internally in collaboration with other partners to respond to the request.	
	7	Small-scale fishing professionals via an Association (OCEANIUM).	The Association (OCEANIUM) submitted a request on behalf of fishing professionals.	Functional working relationship between the association (OCEANIUM), the professionals and the other actors using a participatory approach.	External financial partners.	The main institution (OCEANIUM) organized an internal response to the request.	
	8	Partnership initiated by an international NGO (WWF).	Request submitted by the international NGO (WWF) – the need is not on the part of fisheries professionals.	Implementation of a reflective participatory approach.	External financial partners.	The lead institution which initiated the partnership organized with the professionals (FENAGIE-Pêche) and other actors to find a response to the request.	
	9	Female fish processors GIE via a research Institution (Institute for Food Technology – IFT).	Request from professionals (GIE) via a research institute.	Working relationship between research (ITA), the professionals (GIE) and other partners.	External financial partners.	The lead institution (ITA) found an internal response to the request.	

Terms of reference for the Study: Annex 5

Activities foreseen in the framework of the study of linkages between research and users of fisheries resources.

1. Evaluate the available research potential, its development in the course of the last few years and its possible contribution to SLA;
2. Identify the skills and research in traditional knowledge bases and resource management;
3. Study the impact of Policies, Institutions and Processes (PIP) in the area of research into fishing community livelihoods, using the methodology developed by SFLP, and highlighting the participation of actors in the decision-making process including management;
4. Analyse the links which exist between research, public policies and communities totally or partially dependent on fisheries;
5. Evaluate the contribution of research, including social science based research, on the decision-making process, in fisheries management and the improvement of fishing community livelihoods;
6. Analyse the linkages existing between fisheries research institutes and other institutions conducting research in social sciences (research centres, NGOs, universities etc);
7. Make a diagnosis of the problems facing research in the context of improving fishing community livelihoods, and identifying options for improvement;
8. On the basis of the results of work conducted in each country, prepare proposals for activities to strengthen the contribution of research to poverty alleviation in small-scale fishing communities;
9. Organize a review and validation workshop on the outcomes of the study.

The review workshop bringing together the six countries covered will permit a comparison of the outcomes of different countries and bring activities to a close. This workshop will bring together representatives of technical ministries and research, decision-makers, representatives of the profession and NGOs.

Annex 6: List of participants to the planning workshop

12-14 June 2002 Cotonou, Benin

COUNTRY	SURNAME	NAME	TITLE	ADDRESS	TEL.	FAX.	E-MAIL
Cameroon	MEKE SOUNG	Pierre Nolasque	Chef du Service des Pêches du littoral MINEPIA/DPEPIAL	B.P. 721 Douala	(237) 343 06 42 (237) 340 09 53 (237) 993 25 53	(237) 3421113	PierreMeke@yahoo.com
	DJAMA	Theodore	Chef Station IRAD Limbe (Facilitateur de l'Etude)	B.P. 77 Limbe	Cellulaire: (237) 9558159		theodoredjama@yahoo.co.uk
Guinea	DIALLO	Mamadou Moussa	Chercheur Socio-Economiste	CNSHB B.P. 3738/39 Conakry	(224) 40 46 35	(224) 409107	mdiallo@cnshb.org.gn m.diallo@caramail.com
	BARRY	Talhatou Barry	Chef Division Pêche Artisanale Maritime	B.P. 6129 Conakry	(224) 43 02 50 (224) 41 52 28 (224) 29 74 80		ucn-pmdp@mirinet.com
	KABA	Fodé Mamadou	Directeur National Adjoint de la Pêche Maritime Membre de l'Equipe Nationale d'Etude	Direction Nationale de la Pêche Maritime B.P. 307 Conakry	(224) 41 52 28	(224) 43 11 19 (224) 41 43 10	Ucn-pmdp@mirinet.com
Mali	DIARRA	Soumaïla	Directeur National Adjoint DNAER/Mali Coordinateur National UCN/Mali	B.P. 275 Bamako	(223) 22 25 59 (223) 22 11 34	(223) 22 11 34	dnaerpmdp@datatechtoolnet.org
	DANSOKO	Famoussaba Daniel	Professeur Personne Ressource de l'UCN/Mali	IPR/IFRA de Katibougou B.P. 6 Koulikoro DNAER B.P. 275 Bamako	(223) 222 25 59 (223) 224 16 11	(223) 22 11 34	dnaerpmedp@datatechtoolnet.org dnaer@malinet.ml

COUNTRY	SURNAME	NAME	TITLE	ADDRESS	TEL.	FAX.	E-MAIL
	SANOGO	Youssouf	Biologiste – ONG AGEFORE Membre de l'équipe nationale	B.P. E. 3206 Bamako	(223) 72 31 39 (223) 23 26 80	(223) 23 22 60	yfsanogo@yahoo.fr
Mauritania	DIA	Amadou Bocar	Responsable Administratif et Financier	ONG Mauritanie 2000 B.P. 4242 Nouakchott	(222) 5256128 (222) 6441796	(222) 525 4631	abodia@yahoo.com mauritanie_2000@mauritel.mr
	DIA	Mamoudou Aliou	Chercheur-Conseiller scientifique Directeur IMROP	B.P. 22 Nouadhibou	(222) 5745 124 (222) 5749 035	(222) 5745 081	dvis@toptechnology.mr malioudia@yahoo.fr
	OULD SIDI	Boudbouda	Chef de Service	B.P. 137 Nouakchott MPEM/DEARH	(222) 529 1339 (222) 529 6408	(222) 529 1339	Dearh.mpem@mauritania.mr
Nigeria	OLANIYI	Amos Olatundé	Fisheries & Marine Consultant	National President Fisheries Society of Nigeria Providence Consult & Services LTD. 7th Floor, Development House, 21 Wharf Road, Apapa P.O. Box 54089, Falomo, Lagos	(234) 1 5876192 (234) 80 3308 4369	(234) 1 587 0888 (234) 262 1146	amos492001@yahoo.com
	SHIMANG	Gogwim	Acting Director	Federal Ministry of Agriculture and Rural Development P.M.B 1351, Area 11 Garki, Abuja	(234) 09 3144664 (234) 31 44665	(234) 09 3144662	gogwimshimang@Linkserve.com

COUNTRY	SURNAME	NAME	TITLE	ADDRESS	TEL.	FAX.	E-MAIL
Nigeria	JIM-SAIKI	Lawal Mallam	Senior Resource Officer	Nigerian Institute for Oceanography and Marine Research, Wilmot point road P.M.B 12729, Victoria Island	(234) 615755 (234) 612274 (234) 2619517	(234) 2619517	usfad@yahoo.com
	LADU	Bernard M.B.	Director/CEO	National Institute for Freshwater Fisheries Research (NIFR) P.M.B. 6006, New Bussa, Niger State	(234) 031670 444 (234) 031 670105	(234) 031 670444 (234) 031 670105	gtz-klfpp@t-online.de
	OVIE	Iboko Solomon	Research Scientist and SFLP Project Officer	National Institute for Freshwater Fisheries Research P.M.B 6006, New Bussa Niger State	(234) 031 670244 (234) 031 670241		gtz-klfpp@t-online.de
	UGBODU	Vincent	Assistant Chief Accountant	Nigerian Institute for Oceanography & Marine Research P.M.B. 12729, Lagos	(234) 01 2617530	(234) 01 2617530	niormr@hyperia.com
	ABOHWEYERE	Parcy	Chief Research Officer	Nigerian Institute for Oceanography & Marine Research P.M.B. 12729 Victoria Island, Lagos	(234) 01 2617530	(234) 01 2617530	niormr@hyperia.com parcyochuko@yahoo.com niomr@linkserve.com.ng

COUNTRY	SURNAME	NAME	TITLE	ADDRESS	TEL.	FAX.	E-MAIL
	ANYANWU	Augustina Ogbenyealu	Chief Research Officer	Nigerian Institute for Oceanography & Marine Research P.M.B. 12729 Victoria Island Lagos	(234) 01 2617530	(234) 01 2617530	anyanwu@intracom.net.ng niomr@hyperia.com niomr@linkserve.com.ng
Senegal	SECK	Ibrahima	Ingénieur halieute	Direction des Pêches Maritimes B.P. 283 Dakar	(221) 8 21 65 78 (221) 6 54 58 44	(221) 8 21 47 58	papasud@sentoo.sn
	DIEBEL	Sarr	Chargé de Programme ADPES (ONG)	Cité Kérétou Villa 175 Scat Urbam derrière Station Shell	(221) 827 58 47	(221) 827 58 43	adpes@sentoo.sn
	DEME	Moustapha	Chercheur Economiste	CRODT B.P. 2241 Dakar	(221) 632 50 27	(221) 834 27 92	tapha_deme@hotmail.com mdeme@crodt.isra.sn
Ivory Coast	SANKARE	Yacouba	Chercheur	Centre de Recherches Océanologiques 29 rue des pêcheurs B.P.V 18 Abidjan	(225) 21 355014 (225) 21 355880	(225) 21 351155	sankare@cro.ci y.sankare.fr@yahoo.fr
Consultants	HUSSEIN	Karim	Research Fellow Rural Policy and Environment Group, Overseas Development Institute	ODI 111, Westminster Bridge Road London, SE1 7JD, UK	(+44) (0) 207 922 0368 (+44) (0) 20 79220300	(+44) (0) 20 79220399	k.hussein@odi.org.uk karim.hussein@oecd.org

COUNTRY	SURNAME	NAME	TITLE	ADDRESS	TEL.	FAX.	E-MAIL
	ZOUNDI	S. Jean	Chercheur/Consultant Institut de l'environnement et de Recherches Agricoles (INERA)	INERA 04 B.P. 8645 Ouagadougou	(226) 34 02 70 (226) 34 71 12	(226) 34 02 71	zoundi@hotmail.com zoundi@fasonet.bf
Interpreters	MOUDACHIROU	Caroll	Interprète	06 B.P. 1636 Cotonou	(229) 33 40 49		c_moudachirou@yahoo.com
	HOUNSOU	B. Oscar	Interprète	01 B.P. 2648 Cotonou	(229) 30 86 05 (229) 95 33 01	(229) 38 11 94	hounvou@yahoo.com
SFLP	HOREMANS	Benoît	Chef d'Equipe	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Benoit.Horemans@sflp-pmedp.firstnet.bj
	BREUIL	Christophe	Responsable de la Planification	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Christophe.Breuil@sflp-pmedp.firstnet.bj
	LASSISSI	Akambi	Expert National en Communication	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Akambi.Lassissi@sflp-pmedp.firstnet.bj
	KEBE	Moustapha	Responsable Unité de Suivi	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Moustapha.Kebe@sflp-pmedp.firstnet.bj
	NJOCK	Jean-Calvin	Responsable de la Gestion des Ressources Aquatiques	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	JeanCalvin.Njock@sflp-pmedp.firstnet.bj
	KUYATEH	Mamanding	Community Organization Officer	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Mamanding.Kuyateh@sflp-pmedp.firstnet.bj

COUNTRY	SURNAME	NAME	TITLE	ADDRESS	TEL.	FAX.	E-MAIL
SFLP	TURAY	Foday	Responsable community level project	FAO PMEDP 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Foday.Turay@sflp-pmedp.firstnet.bj
	TOHOUEGNON	Philippe	Expert National Bibliothécaire	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Philippe.Tohouegnon@sflp-pmedp.firstnet.bj
	HOLVOET	Katrien	Responsable community level project	FAO PMEDP 01 B.P. : 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Katrien.Holvoe@sflp-pmedp.firstnet.bj
	GNAKADJA	Gérard	Assistant Suivi	FAO PMEDP 01 B.P. : 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Gerard.Gnakadja@sflp-pmedp.firstnet.bj
	OLOMU	Kofo	Assistante en Communication	FAO 01 B.P. 1369 Cotonou	(229) 33 09 25	(229) 33 05 19	Kofo.Olomu@sflp-pmedp.firsnet.bj

8. BRIDGING THE GAP BETWEEN FISHERIES RESEARCH AND ACTION

Benedict P. Satia[1]

SUMMARY

This paper shows that the use of research findings to promote sustainable fisheries production and improved livelihoods in fisheries communities is constrained by a myriad of interrelated factors conditioned by circumstances within and outside the fishery sector. However, recent international developments, particularly the increased emphasis to eliminate the technical, institutional and political obstacles to effective management and use of fishery resources through a series of interactive processes and mechanisms, favour improvements in the relevance of research and reinforces the interface between researchers and users of research findings. The report also provides a list of strategies and mechanisms to bridge the gap between research and action.

1. INTRODUCTION

Research is vital to building policies contributing to sustainable fisheries and could play an important role in validating and promoting a policy, as well as mobilizing necessary resources. Although significant progress has been made in fisheries research over the last three decades, as seen in the impressive number of peer-reviewed publications and grey literature on capture fisheries and aquaculture[2], the real advantage to fish stocks[3] and humans[4] is difficult to quantify, or even justify, simply through reported status and trends.

This paper accomplishes three main objectives. First, it shows that the missing link between research and action is not comprised of just one factor, but a myriad of interrelated factors conditioned by circumstances within and outside the fishery sector. Second, it discusses the changing international context that favours improvements in the relevance of research and the link between research and the end users[5] of research results. Finally, it provides suggestions to bridge the gap between research and action.

A basic tenet underlining this report is that in order to effectively transform research results into action, researchers and users must be committed to each other. This commitment requires the willingness to build an effective relationship based on shared access to information, communication and transparency.

2. FACTORS COMPRISING THE MISSING LINK

The interface between research and action is very often problematic because of the different settings in which research and decision-making processes operate. A number of reasons contribute to this challenge, such as different perceptions of the problem or issues, the targeted end-users of research results, inadequate institutional linkages, barriers to communication, etc.

The fisheries scientist[6] and the end user may define the same issue differently. The researcher or scientist may observe a fishery problem by going back almost exclusively to the biotic and abiotic factors affecting fishery resource management and use. The policy-maker, as an example of an end user, on the other hand might frame the same problem in terms of economic and political consequences. Put differently, scientists tend to use the resource as the starting point while policy-makers study the "social consequences" of the resource or the perceived outcome. The proposed solution may reflect this very different understanding of the same fishery problem.

---

[1] Dr Satia is Chief of the International Institutions and Liaison Service, Secretary of the Committee on Fisheries (COFI) and Secretary of the FAO Advisory Committee on Fisheries Research (ACFR).

[2] A search in the Aquatic Sciences and Fisheries Abstract (ASFA) database indicates that over 300 000 publications on fisheries and aquaculture were published between 1993 and 2002.

[3] According to FAO, the State of World Fisheries and Aquaculture (SOFIA) 2002 – http://www.fao.org/docrep/005/y7300e/y7300e00.htm, an estimated 9 to 10 percent of fish stocks have been depleted or are recovering from depletion, about 15 to 18 percent are overexploited, another 47 to 50 percent of fish stocks are fully-exploited, and the remaining 25 to 27 percent are underexploited.

[4] Recent international instruments such as the 1995 FAO Code of Conduct for Responsible Fisheries, the 1996 Rome Declaration on World Food Security, the United Nations Millenium Declaration, the World Summit on Sustainable Development (WSSD) Political Declaration and Johannesburg Plan of Implementation (JPI) 2002, deplore the increasingly widespread poverty in the world, a significant portion of which consists of those involved in small-scale fisheries.

[5] Research is used and relied upon by a large and varied number of people, policy-makers, donor organizations, fishers and fish workers, as well as civil society organizations.

[6] The term scientist also applies to those undertaking socio-economic work in fisheries.

In some cases, the policy-maker or other end user may be interested in treating the immediate symptoms and less interested in addressing the underlying causes. As both the researcher and end user have different perceptions of an issue, the "solutions" proposed by the researcher are unlikely to fit the problem as perceived by the end user. Furthermore, the situation may be complicated by different time horizons: scientists, particularly biologists, often take a longer-term view either because the problems cannot be solved within a shorter period and/or they are not often under great pressure from persons facing problems. On the other hand, policy-makers often have a much shorter time frame to meet political objectives, such as a forthcoming election. Fishers, for livelihood reasons and in the absence of other employment opportunities, may also seek quick results.

In many cases in the scientific establishment, scientists view their peers as the *de facto* end users of research. Scientists tend to be judged by their scientific output and, in the "publish or perish environment", very few scientists have experienced career advancement through advice adopted by a fishing community. The attitude of some scientists leaves the impression that research is undertaken for scientific prestige rather than as a contribution to improve the sector or that of any particular fishery stakeholder. This does not deny the fact that in recent years, end users such as fishers, fishworkers and owners have been involved in some research work as participatory approaches are more widely used. Nonetheless, it is probably correct to state that when fisheries research – applied or strategic – is not targeted to the needs of any particular set of end users, the likelihood of it having a significant economic and/or social impact diminishes. This "weakness" is perhaps accentuated by inadequate/inappropriate human capacity development processes[7] and remuneration schemes.

As concerns scientific training, many universities instill a belief in students that pure science and academic science are superior to applied science, leaving students with a view that universities are the better place for employment. Moreover, government pay structures and incentive policies do not really challenge this academic attitude because government scientists are generally less well-compensated and have less attractive working conditions than academics.

In some circumstances, scientists may not view policy-makers as the appropriate client for their research and even policy-makers may not see the research community as producing relevant information for policy-making purposes. Furthermore, even when scientists have very valuable results, some seem to lack the skill to convert or transform such results in a form for decision-making. James Brown,[8] in an article on the role of science in fisheries management (with specific reference to fish stocks in European waters), observed that the poor state of many fish stocks in European waters is attributed to a range of causes: scientists are chastised, particularly by industry, for providing poor, inacurate, or overly cautious management advice; managers are criticized for being out of touch with industry needs; management measures adopted by politicians are claimed to serve short-term political goals; and, fishworkers are accused of, or directly implicated in, undertaking unsustainable fishing practices.

Sometimes the research community seems to forget or undermine the crucial role or the major link policy-makers could play in promoting good research: by ensuring such work fits into national development agendas, in providing financial resources, or in the uptake of research results. Without a commitment from policy-makers in the research process, inadequate financial resources might be attributed for research or support services, such as extension programmes and training institutions. Some fisheries researchers tend to consider fishers as the ultimate users of their work, by-passing policy-makers. In these circumstances, problems may be encountered in distributing the results to the end users except when a participatory approach is adopted and includes the active involvement of fishers or fishworkers throughout the entire research process. Difficulties can arise when the research work does not fit into the overall national development plan and policy, when extension services are not able to effectively help disseminate results, and when those who should have been involved in the process are excluded.

---

[7] FAO 2002. Report of the Fourth Session of the FAO Advisory Committee on Fisheries (ACFR), FAO Fisheries Report No. 699, Rome, 10-13 December 2002, paras. 58-61.

[8] James Brown 2003. The Role of Science in Fisheries Management. In El Anzuelo, European Newsletter on Fisheries and the Environment, Vol. 12.

On the other hand, some policy-makers look at researchers as suppliers of information to extension services or fishers' associations, but not to provide advice and input for public policy matters. In this context, there are instances where policy-makers have been receiving reasonable scientific advice for decades but continually ignore it. It is difficult to quantify the extent to which the different time horizons and differently perceived objectives of scientists and end users factor into this situation. The present state of affairs is the result of a shared responsibility, or negligence, by both scientists and end users and strongly reinforces the need for a commitment from each.

Donors and external funding significantly impact fisheries research in developing countries. At times such assistance, although important and potentially useful, does not take into account national priorities and more often than not, research findings are overlooked. For example, staff might be trained in areas that do not correspond to national plans and policies. As a result, such personnel generally face frustrations as they do not have the national support or framework to use their acquired skills in order to improve the national fisheries sector. Whereas in many developed and well-functioning democracies there is likely to be a high degree of political involvement and an educated and aware public, the contrary exists within the institutional setting of some developing countries, particularly low-income developing countries. In such situations, donor influence is very high and policy-makers may tend to impose policy for which research results, if any, may not be taken intoconsideration.

Fisheries as a renewable natural resource lends itself to a multidisciplinary approach in both technical and policy formulation and implementation. This calls for the involvement of all relevant departments and ministries with emphasis on horizontal consultation and coordination. However, this is the exception and not the rule. In some countries, the compartmentalization of ministries may even work against bridging the gap between research and action, the department of fisheries being unaware of developments in fisheries research and vice-versa. It could be hypothesized that developed countries tend to favour strong institutions and, as such, a more research-to-action attitude as the demand for scientific input into the decision making process increases or is demanded by the community and other stakeholders.

The lack of a common communication framework between researchers and end users may impede the flow of information, which may lead to mistrust and antagonism. This can occur because scientists tend to use technical terminology to describe research problems and results whereas policy/decision-makers tend to use socio-economic, legal or political terminology. And then, at the other end, the fisher or fishworker is not interested in the "jargon" used but simply wishes to have perceived improvements in his/her livelihood. When little attempt is made to find a common nexus, information flow may be interrupted or misunderstandings arise, leaving room for distrust. Furthermore, the analytical nature of research leads scientists to divide problems into component parts usually with little attempt to synthesize the information into "research briefs" which would enable users to reach policy conclusions or more easily utilize the research findings.

Effective and efficient extension services are essential in order to translate research outcomes into forms that managers, fishers and fishworkers can straightforwardly understand and apply. However, the lack of communication between research institutions and extension services may render this virtually impossible in some developing countries. This could be further complicated by the lack of appropriate skills and competence within existing extension services to turn research findings into appropriate extension material.

Scientists tend to look at publications, books or presentations at professional meetings or conferences as material directed mainly to their peers, as the standard means of transmitting research results. In addition, scientists regard timeliness and rapidity as important to win the prize, so research results are apt to be published as soon as available, whereas policy-makers take into account the political agenda and opportunities as well as the social relevance of the conclusions. This suggests that the findings may not be immediately applied or taken into account by policy-makers. Scientists believe that data is not neutral because it is the result of an exercise of value, beliefs and assumptions, whereas policy-makers need to reconcile perspectives and opinions in the framework of available data.

3. THE CHANGING INTERNATIONAL CONTEXT AND IMPROVEMENTS BETWEEN RESEARCH AND ACTION

While the above and other factors can impede, or even weaken, the link between fishery researchers and end users and *ipso facto* action, there are also a number of aspects that favour the increased relevance of research and improve the interface between research and decision-making. The international community is particularly interested in seeing that technical, institutional and political obstacles to effective management and use of fishery resources are corrected. The unanimous adoption of the Code of Conduct for Responsible Fisheries by the FAO Conference in 1995 and the content of several other instruments, such as the 1996 Rome Declaration on World Food Security, the United Nations Millennium Declaration adopted by the 54th Session of the General Assembly in 2000, the WSSD Political Declaration and Plan of Action in 2002, demonstrate the widespread commitment of the international community to achieving sustainable fisheries, resources and environment conservation[9]. The international declarations also portray the concerns of the international community for the livelihoods of the world's poor, a significant proportion of whom are small-scale fishers. In addition, these declarations contain evidence of the increasing interest to promote (fisheries) research as the demands of the international community cannot be met without focused research efforts[10].

Beyond the effects of improved livelihoods and the need to address fisheries problems to ensure that the fisheries sector contributes to internationally-agreed upon development objectives, there are other factors that tend to promote better cooperation between fisheries research and end users, particularly policy-makers. These include increased focus on fisheries governance, democratization and decentralization, increased economic liberalization, new developments in communication and information technologies, and the emergence of new research methods.

Currently, the role of government is changing and stakeholders are assuming greater participation in the decision-making porcess. The challenge for states is how to promote and facilitate fisheries governance that is effective in terms of conservation and economic performance, equitable for both current and future generations, and broadly accepted by all stakeholders. The latter includes those who have a direct and real interest in the fisheries sector and those who do not but who, nonetheless, consider that they have a right to participate in decisions concerning what they deem a heritage of humankind. It is this situation, highly summarized, that challenges States, as national resources custodians, and stakeholders, in reaching arrangements designed to strengthen fisheries governance that will ensure the sustainable exploitation of fisheries resources. This renewed mutual commitment also applies to fisheries research as detailed in Article 12 of the FAO Code of Conduct for Responsible Fisheries.

Linked to increase focus on fisheries governance is the fact that new development in communication and information technologies are making it possible to share information widely, quickly and cheaply. Fishers, including small-scale fishers and fishworkers (even in developing countries), have access not only to national radio but also to local community-based radio stations and have cellular telephones. In addition, participatory methods have opened up new avenues to involve users in assessing, planning, executing and evaluating activities, thus improving the knowledge base as well as the environment in which activities are undertaken. The techniques, if well used, provide users with access to information on a wide range of subjects that can improve their livelihoods.

Through democratization and decentralization, governments are becoming more accountable to their people, and local authorities and community members are becoming more involved in activities within their communities. This contributes to increasing awareness about critical sustainable development issues, increases their knowledge of possible solutions and approaches, and also motivates community members to implement change. Briefly, local and community members are undergoing a process of change in which they are no longer only recipients of information but partners in the development of new solutions through research, including the use of local and indigenous knowledge to support sustainable development issues.

---

[9] In several developed countries, environmental well-being is an important consideration and a growing number of consumers seek assurances that their product choice does not cause environmental harm and social and economic dislocation.

[10] It should furthermore be pointed out that these goals are relatively inexpensive to implement. But when the cost means decreasing jobs or wages, or spending more money on management, decision-makers often are reluctant or fail to deliver on these goals, even if good and relevant scientific information can be used to support the decision.

Lastly, with the advent of increasing economic liberalization, many governments are appreciating the fact that, where appropriate, they should concentrate more on creating and maintaining a suitable supportive/enabling environment, in particular, a policy and regulatory environment that catalyses private sector initiatives, including research.

4. STRATEGIES AND MECHANISMS TO BRIDGE THE GAP BETWEEN RESEARCH AND ACTION

Forging an effective interface between research and end users to generate the appropriate conditions that result in the uptake of research findings is a difficult challenge. However, it is possible to capitalize on the worldwide political and institutional developments that are altering the relationships between government and people to bridge the gap between research and action.

Following are a number of strategies or mechanisms that could contribute to bridging this gap:

- More stakeholers, especially the end users in the form of fishers and fishworkers, should be included in research. This would make research more demand-led and increase ownership, and ensure that results are more likely to be useful to the end users.
- Funding has a major influence on the direction of research and support services. Such funding should be adequate, and donor and external assistance should be in line with national plans and policies. Funding should also be allocated for effective horizontal consultation and coordination among institutions, stakeholders and civil society organizations.
- Research and communication go hand-in-hand; hence emphasis should be placed on developing techniques for effective communication whereby researchers and end users benefit from the packaging and presentation of research findings in ways that are easily understood by the target audience.
- In the presentation of research, implications should be clearly articulated. Good research may not result in appropriate action for political reasons unless the benefits and implications are clearly communicated.
- In many settings, human capacity is insufficient and must be considered as a crucial and long-term requirement to improve linkages between research and action. In this respect, retention and incentives are important issues, and donor-funded research programmes should include long-term aspects of capacity-building.
- Greater emphasis should be placed on using multidisciplinary teams and adopting participatory approaches in fisheries research. This would assure that researchers, end users and support services can harness and use information from various sources for better fishery production and improved livelihoods in fisheries communities.
- Research should be embedded in national planning and review processes. This would ensure that research will be most relevant and effective and would also render the research more action-oriented.
- Effective and efficient support services are essential to translate research results into action. Emphasis should be placed in establishing and/or strengthening existing support services.
- The 1995 FAO Code of Conduct for Responsible Fisheries contains references and principles for improved fisheries research and for bridging the gap between research and action, specifically Articles 12.6, 12.8, 12.9, 12.13, and 12.16. States and all other stakeholders should work to effectively apply these principles.

This document contains the discussion papers presented at the second session of the Working Party on Small-scale Fisheries of the Advisory Committee on Fisheries Research held in Bangkok, Thailand, from 18 to 21 November 2003.

ISBN 92-5-105256-5 ISSN 0429-9337
9 789251 052563
TR/M/Y5808E/1/12 04/1200